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Floating Ball Valves



Table of Contents

Introduction

Quality is our commitment, while competitive price and timely delivery is our promise.

From the beginning, the DHV name has become associated with quality in every step of our manufacturing process. For the past decades our customers worldwide have trusted us to provide them with consistent and reliable valve products in their most severe and critical service.

We at DHV are proud of our ability to meet the stringent requirements of Refining, Gas/Oil, Pipeline, Petrochemical and Power Plant.

DHV Ball Valves are designed, manufactured and tested to the latest manufacturing specifications of the American & International Standards Organizations. We welcome your challenges and look forward to serving your critical project needs.

• Figure Number System	2
• Floating Ball Valves Overview	3
• Design Standards and Specifications	4
• Design Features	5
• Two-piece Forged Steel Body, Small Size Ball Valves	6
• Two-piece Forged Steel & Cast Steel Body Ball Valves	9
• Pocketless Style Body Ball Valves	13
• Threaded & Socket Weld End Small Size Ball Valves	16
• One-piece Body, Small Size Ball Valves	17
• Two-piece Body, Small Size Ball Valves	18
• Three-piece Body, Small Size Ball Valves	19
• Materials Pressure - Temperature Chart	20
• Terms & Conditions	21



DHV Figure Numbers

Ball Valves

Type

- | | |
|--|--|
| 1 = Floating Ball Split Body, Full Bore | C3 = Trunnion Ball Valve, Fully Welded, Two-Piece Body, Full Bore |
| 2 = Floating Ball Split Body, Reduced Bore | C4 = Trunnion Ball Valve, Fully Welded, Two-Piece Body, Reduced Bore |
| 3 = Trunnion Ball Two-Piece Body, Full Bore | C5 = Trunnion Ball Valve, Fully Welded, Three-Piece Body, Full Bore |
| 4 = Trunnion Ball Two-Piece Body, Reduced Bore | C6 = Trunnion Ball Valve, Fully Welded, Three-Piece Body, Reduced Bore |
| 5 = Trunnion Ball Three-Piece Body, Full Bore | D = Rising Stem Ball Valves, Full Bore |
| 6 = Trunnion Ball Three-Piece Body, Reduced Bore | E = Rising Stem Ball Valves, Reduced Bore |
| 7 = Floating Ball One-Piece Body, Reduced Bore | X = Special |
| 8 = Small size Floating Ball valve. see* | |
| 9 = Top Entry Trunnion Ball Valves | |
| 0 = Three Way Ball Valves | |

Note: *For valve bore type note designated, For valve bore type not designated, add R for reduce bore, F for full bore. 8R is reduce bore small size ball valve, 8F is full bore small size ball valve.

Pressure Class

- 15 = Class 150
30 = Class 300
60 = Class 600
80 = Class 800
90 = Class 900
150 = Class 1500
250 = Class 2500
100=1000 WOG
200=2000 WOG
300=3000 WOG
500=5000 WOG
600=6000 WOG
1000=10000 WOG

Body Material

- 0 = ASTM A216 WCB
1 = ASTM A105
2 = ASTM A352 LCB
3 = ASTM A350 LF2
4 = ASTM A351 CF8M
5 = ASTM A182 F316
6 = ASTM A351 CF8
7 = ASTM A182 F304
8 = ASTM A890 4A
9 = ASTM A182 F51
A = ASTM A352 LCC
B = Inconel
C = Monel
D = Super Duplex S.S.
E = ASTM A240 UNS N08926
F = ASTM A216 WCC
X = Special

Code

- B = Ball Valves
L = Cryogenic Ball Valves
M = Metal-to-Metal Seat Ball Valves

12" Ball Valve, Floating Ball Split Body, Full Bore, Class 150LB, ASTM A216 WCB Body & Adapter Raised Face Flanged End, with 316SS Trim and PTFE Seat and Seal, Gear Operated, Inconel 625 Overlay.

Example: 12"-B1150F31-GO-I

End Connections

- F = Raised Face Flanged End
R = Ring Type Joint Flanged End
P = Plain Flat Face Flanged End
B = Butt-welded End
T = Threaded End
S = Socked-Welded End
X = Other Type End Connection
G = Grayloc Hub End
U = Pup Piece End

Trim Material

- 1 = C.S. + ENP
2 = 304SS
3 = 316SS
4 = 13Cr / F6
5 = Duplex S.S.
6 = Monel
7 = Inconel
8 = B16
9 = B62
A = S.S. + Ni
B = S.S. + HCr
C = Super Duplex S.S.
D = S.S. + T.C
E = C.S. + T.C
F = C.S. + Ni
G = C.S. + HCr
H = C.S. + CCC
I = S.S. + CCC
X = Special

Seat Material

- 1 = PTFE
2 = R-PTFE
3 = NYLON
4 = VITON
5 = DEVLON
6 = NBR
7 = PEEK (HT4)
8 = Ni
9 = STL
A = CCC
B = T.C
M = NYLON-M
C = PCTFE
P = PAI
X = Special

Operator

- NONE = Lever or Handwheel Operator
CO = Chain Wheel Operator
GO = Gear Operator
BS = Bare Stem
EM = Electric Motor Operator
PA = Pneumatic Actuator
HA = Hydraulic Actuator
PH = Pneumatic-Hydraulic Actuator

Internal Coating

- None = No Coating
P=Plasite 7159
E = Enduro Bond
I = Inconel 625 Overlay
N = Inconel 825 Overlay
D = Duplex SS Overlay

Description

Floating ball valves are widely used and not limited to the oil and gas industry. DHV has developed a variety of floating ball valves for different services. They are designed and manufactured to various international standards, such as ISO, ANSI, and API standards, as well as special customer standards and requirements. A variety of body and trim materials can be provided to meet different services, including carbon steel, stainless steel, duplex stainless steel, along with a variety of operators, including lever, gearbox, electric actuator, and pneumatic actuators.

DHV has three main series of flanged end floating ball valves and three main series of NPT threaded or socket welding end floating ball valves.

Flanged end:

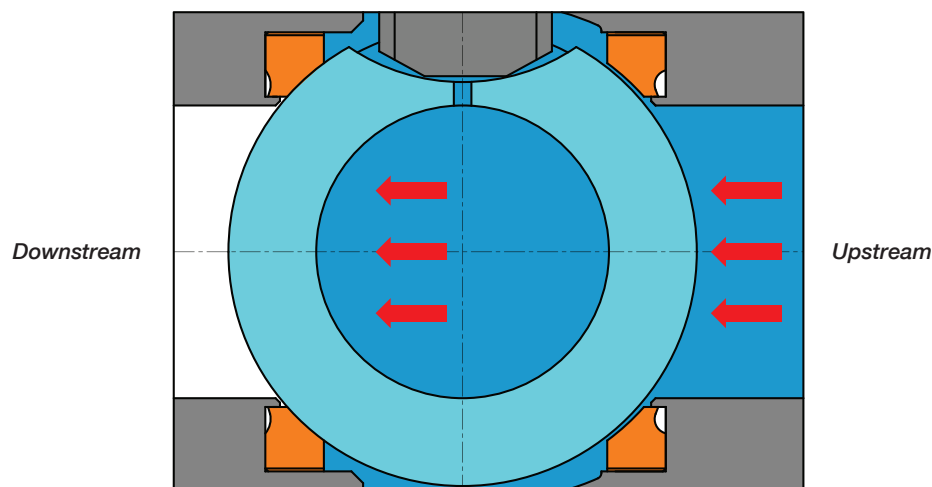
- SB series: Two-piece Forged Steel Body, Small Size Ball Valve
- FB series: Two-piece Forged Steel or Cast Steel Body Ball Valve
- FH series: Two-piece Forged Steel Body, Pocketless Style Ball Valve

NPT threaded or socket welding end:

- SA1 series: One-piece Body, Small Size Ball Valve
- SA2 series: Two-piece Body, Small Size Ball Valve
- SA3 series: Three-piece Body, Small Size Ball Valve

Sealing Principle

The ball is floating, therefore when the valve is closed, the upstream medium pushes the ball, moving it against the downstream seat forming a reliable seal downstream. The soft seated floating ball valve is usually designed bi-directionally.





Floating Ball Valves-Flanged End

Applicable Standards

Basic Design:	ASME B16.34, ISO 17292, BS 5351, API 608, API 6D
Face to Face:	ASME B16.10
Flange End:	ASME B16.5
Butt Welding End:	ASME B16.25
Test and Inspection:	API 598, API 6D
Fire-safe Test:	API 607
Fugitive Emission Test:	ISO 15848-2
Type Testing for FE:	ISO 15848-1, API 641
Manufacturing to NACE latest version on request	
CSA Z245.15 latest version compliance is available	



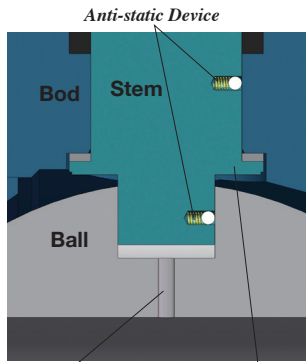
Specifications

Size Range:	SB: 1/2" ~ 2" FB: 1-1/2" ~ 12" FH: 1/2" ~ 8"
Pressure Range:	SB: 150LB ~ 2500LB FB: 150LB ~ 600LB FH: 150LB ~ 600LB
End Connection:	Flanged end / Butt welding end
Bore:	Full bore / Reduced bore
Valve Direction:	Bi-directional
Operation:	Manual Operation: Lever, Gearbox Actuated Operation: Electric Actuator, Pneumatic Actuator, Hydraulic Actuator, etc.
Material:	Body: Carbon steel, Stainless steel, Duplex stainless steel, etc Trim: Stainless steel, Duplex stainless steel, etc



Floating Ball Valves-Flanged End

Design Features



Pressure Balance Hole Blow-out Proof Stem

Blow-out Proof Stem

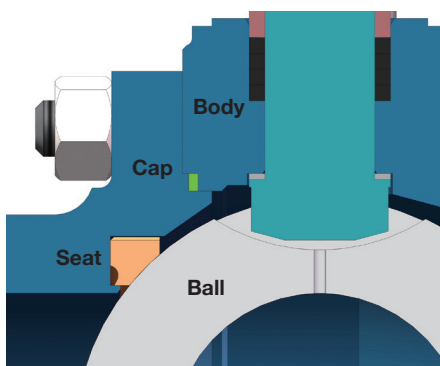
The stem is designed with a shoulder that is retained by the body preventing the stem from being blown out from internal pressure.

Anti-static Device

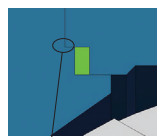
The anti-static device is designed between the ball, stem, and body to maintain electrical continuity and avoid static charges.

Pressure Balance Hole

The ball is designed with a balance hole that prevents pressure from being trapped within the body cavity.



Before Fire



Metal to Metal Seal



Metal to Metal Seal



Metal to Metal Seal After Fire

Unique Seat Design

A special integral seat lip provides a tight seal under both low and high pressure while maintaining low operational torque.

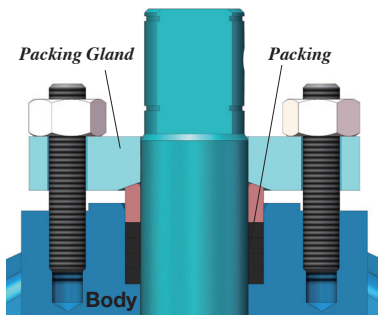
Fire Safe Design

External leakage prevention

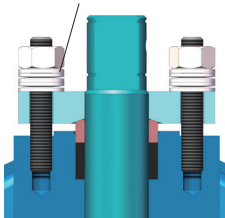
A fire-safe gasket and a metal-to-metal sealing face are designed in the body-cap area, and a metal-to-metal sealing face is designed in the stem area. After a fire, the body-cap gasket and metal sealing face prevent external leakage.

Internal Leakage Prevention

After the soft seat is destroyed by fire, the fluid pushes the ball against the metal sealing face on the valve body to prevent flow.



Live-loaded Packing

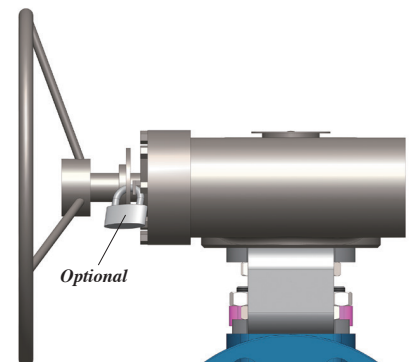
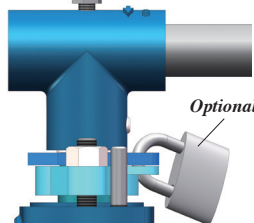
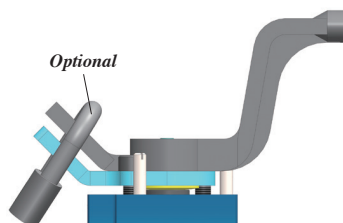


Adjustable Packing Design

DHV floating ball valves are designed with an adjustable stem packing flange. This allows tightening of the packing bolts to ensure sealing performance. The packing material can be graphite or PTFE V-packing. There is also an available live-loaded packing design for severe service. This design utilizes disc springs to maintain adequate tightness to the packing.

Locking Device

Both lever and gearbox operated valves offer a locking point at the full open and full closed positions to protect valve against unauthorized operation. Please note the padlock is not provided standard, it can be provided upon request.

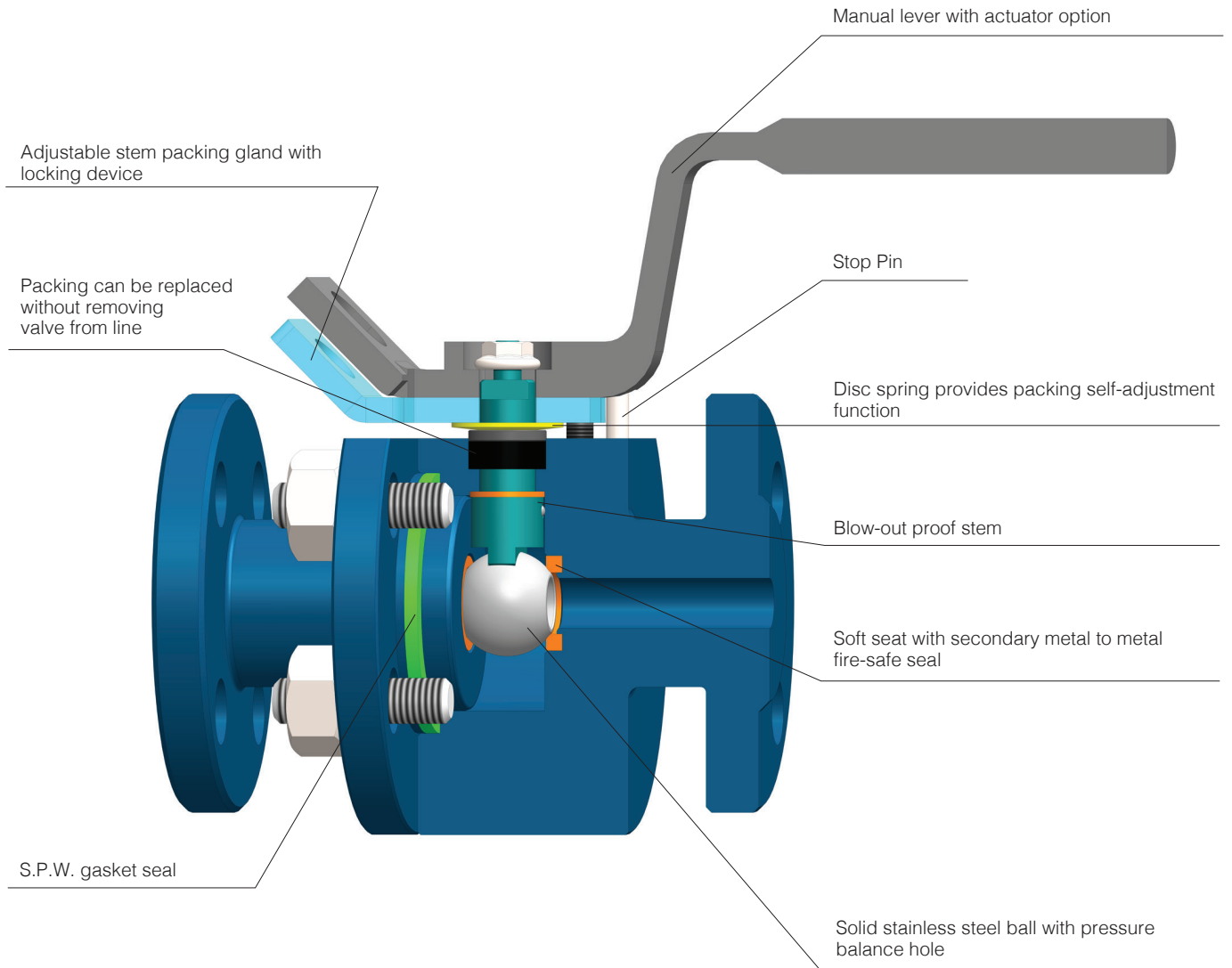




Floating Ball Valves-Flanged End

SB Series—Two-piece Forged Steel Body, Small Size Ball Valves

Typical Structure



Note: Picture shown above is typical design, other configurations are available upon request.



Floating Ball Valves-Flanged End

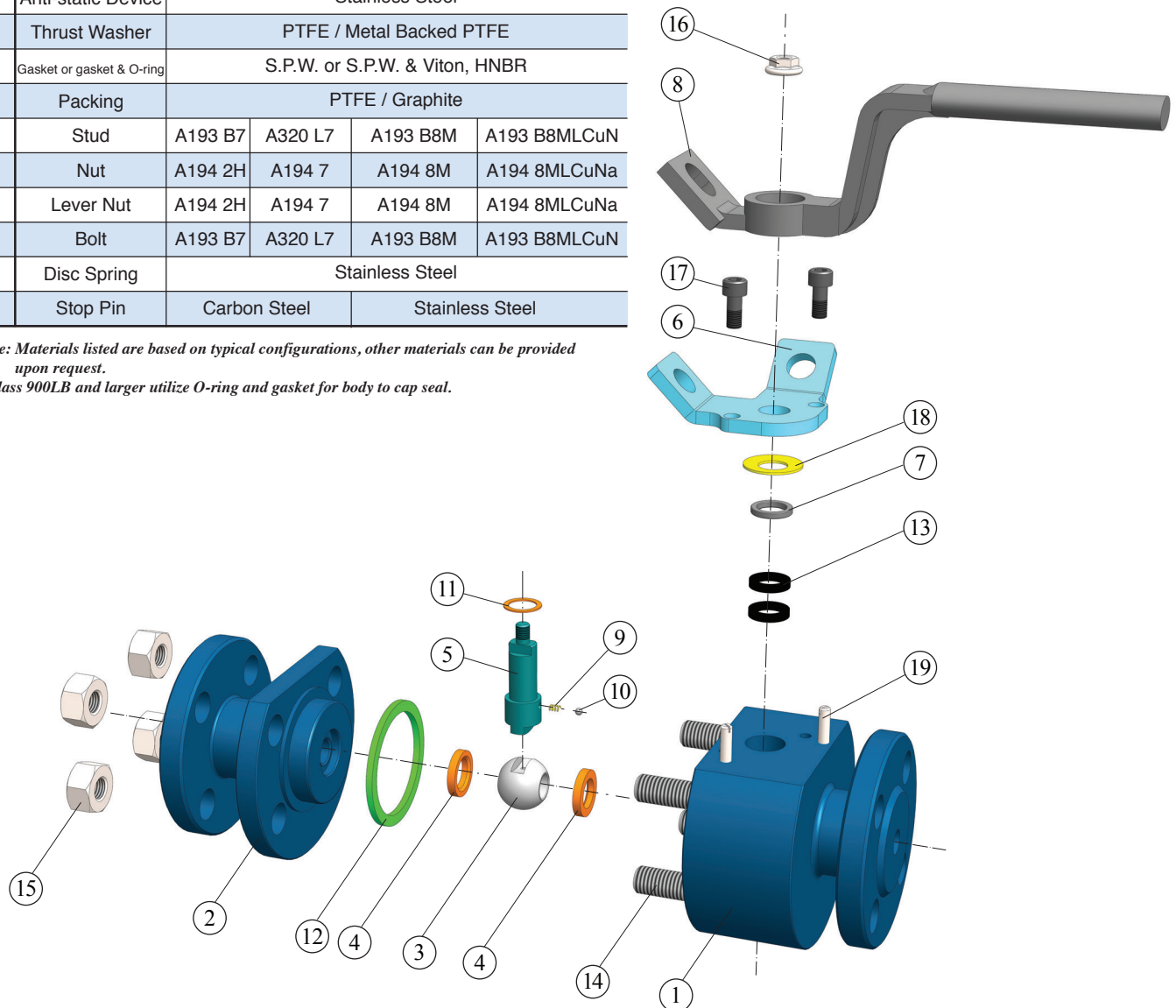
SB Series—Two-piece Forged Steel Body, Small Size Ball Valves

Material Specification

No.	Description	Carbon Steel		Stainless Steel	
1	Body	A105	A350 LF2	A182 F316	A182 F51
2	Cap	A105	A350 LF2	A182 F316	A182 F51
3	Ball	ASTM A182 F316			A182 F51
4	Seat	PTFE / R-PTFE / NYLON / DOVLON / PEEK			
5	Stem	ASTM A182 F316			A182 F51
6	Packing Gland	A105	A350 LF2	A182 F316	A182 F51
7	Packing Ring	ASTM A182 F316			A182 F51
8	Lever	Carbon Steel			
9	Anti-static Device	Stainless Steel			
10	Anti-static Device	Stainless Steel			
11	Thrust Washer	PTFE / Metal Backed PTFE			
12	Gasket or gasket & O-ring	S.P.W. or S.P.W. & Viton, HNBR			
13	Packing	PTFE / Graphite			
14	Stud	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
15	Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
16	Lever Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
17	Bolt	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
18	Disc Spring	Stainless Steel			
19	Stop Pin	Carbon Steel		Stainless Steel	

Note: Materials listed are based on typical configurations, other materials can be provided upon request.

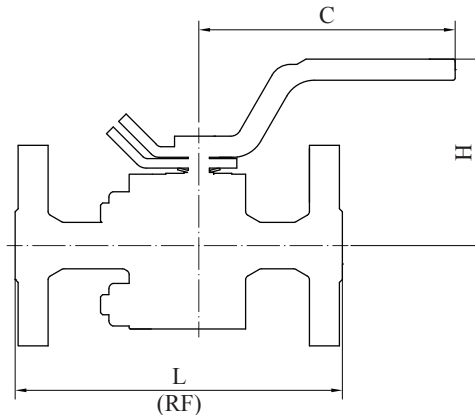
** Class 900LB and larger utilize O-ring and gasket for body to cap seal.*





Floating Ball Valves-Flanged End

SB Series—Two-piece Forged Steel Body, Small Size Ball Valves



150LB

Description		Valve Size						
		1/2x3/8"	1/2"	3/4x1/2"	3/4"	1x3/4"	1"	1-1/2x1"
Flanged End L	in	4.25	4.25	4.61	4.61	5.00	5.00	6.50
	mm	108	108	117	117	127	127	165
Height H	in	3.43	4.17	4.17	3.94	3.94	3.74	6.61
	mm	87	106	106	100	100	95	168
Lever Length C	in	4.72	4.92	4.92	6.89	6.89	9.84	11.81
	mm	120	125	125	175	175	250	300

300LB

Description		Valve Size						
		1/2x3/8"	1/2"	3/4x1/2"	3/4"	1x3/4"	1"	1-1/2x1"
Flanged End L	in	5.51	5.51	5.98	5.98	6.50	6.50	7.52
	mm	140	140	152	152	165	165	191
Height H	in	3.43	4.17	4.17	4.37	4.37	3.74	6.61
	mm	87	106	106	111	111	95	168
Lever Length C	in	4.72	4.92	4.92	6.89	6.89	11.81	11.81
	mm	120	125	125	175	175	300	300

600LB

Description		Valve Size							900LB			
		1/2x3/8"	1/2"	3/4x1/2"	3/4"	1"	1-1/2x1"	1-1/2"	1"	1-1/2x1"	1-1/2"	2x1-1/2"
Flanged End L	in	6.46	6.50	7.52	7.52	8.50	9.49	9.49	10.00	12.01	12.01	14.49
	mm	164	165	191	191	216	241	241	254	305	305	368
Height H	in	3.43	4.17	4.17	4.37	3.74	3.74	6.77	5.63	5.39	6.73	6.77
	mm	87	106	106	111	95	95	172	143	137	171	172
Lever Length C	in	4.72	4.92	4.92	6.89	11.81	11.81	11.81	11.81	11.81	11.81	11.81
	mm	120	125	125	175	300	300	300	300	300	300	300

1500LB

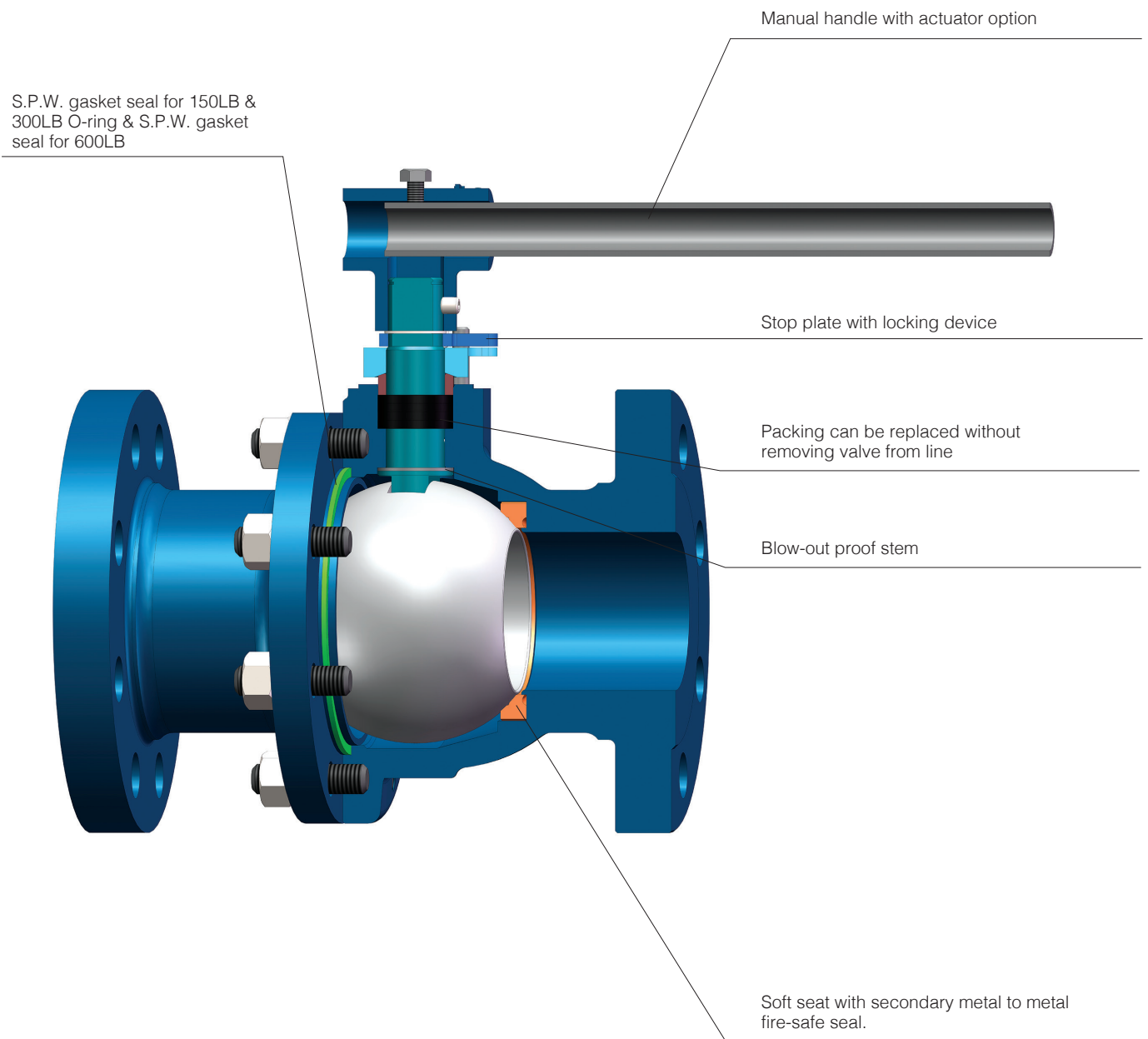
Description		Valve Size								2500LB	
		1/2x3/8"	1/2"	3/4x1/2"	3/4"	1x3/4"	1"	1-1/2x1"	1-1/2"	3/4x1/2"	2x1-1/2"
Flanged End L	in	8.50	8.50	9.02	9.02	10.00	10.00	12.01	12.01	10.75	17.76
	mm	216	216	229	229	254	254	305	305	273	451
Height H	in	4.84	5.28	5.28	4.37	4.37	5.63	5.39	6.73	5.08	6.26
	mm	123	134	134	111	111	143	137	171	129	159
Lever Length C	in	5.91	5.91	5.91	6.89	6.89	11.81	11.81	11.81	6.89	23.62
	mm	150	150	150	175	175	300	300	300	175	600



Floating Ball Valves-Flanged End

FB Series—Two-piece Forged Steel & Cast Steel Body Ball Valves

Typical Structure



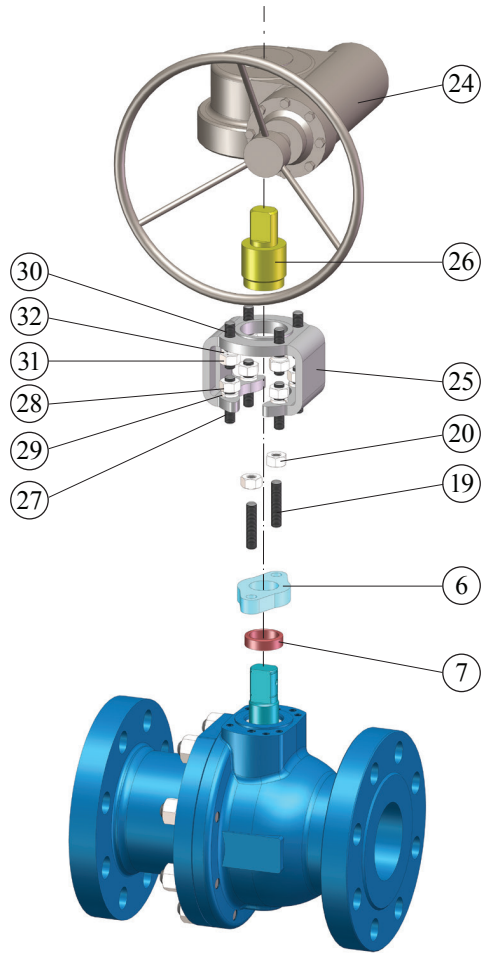
Note: picture shown above is typical design, other configurations are available upon request.



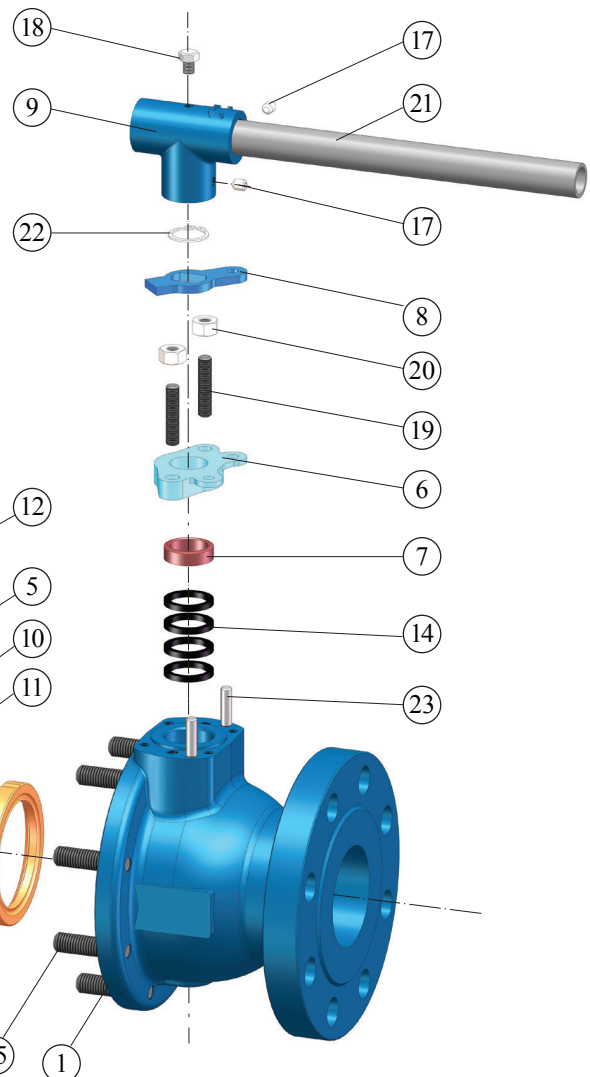
Floating Ball Valves-Flanged End

FB Series—Two-piece Forged Steel & Cast Steel Body Ball Valves

Gearbox Operated



Handle Operated





Floating Ball Valves-Flanged End

FB Series—Two-piece Forged Steel & Cast Steel Body Ball Valves

Material Specification

No.	Description	Carbon Steel		Stainless Steel	
1	Body	A216 WCB	A352 LCC	A351 CF8M	A995 4A
		A105	A350 LF2	A182 F316	A182 F51
2	Cap	A216 WCB	A352 LCC	A351 CF8M	A995 4A
		A105	A350 LF2	A182 F316	A182 F51
3	Ball	A182 F316			A182 F51
4	Seat	PTFE / R-PTFE / NYLON / DOVLON / PEEK			
5	Stem	A182 F316			A182 F51
6	Packing Gland	A216 WCB	A352 LCC	A351 CF8M	A995 4A
7	Packing Ring	A276 410		A182 F316	A182 F51
8	Stop Plate	Carbon Steel			
9	Handle Adapter	Carbon Steel			
10	Anti-static Device	Stainless Steel			
11	Anti-static Device	Stainless Steel			
12	Thrust Washer	R-PTFE			
13*	Gasket or gasket & O-ring	S.P.W. or S.P.W. & Viton, HNBR			
14	Packing	PTFE / Graphite			
15	Stud	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
16	Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
17	Screw	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
18	Bolt	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
19	Stud	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
20	Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
21	Handle	Carbon Steel			
22	Snap Ring	Carbon Steel		Stainless Steel	
23	Stop Pin	Carbon Steel		Stainless Steel	
24	Gearbox	Carbon Steel			
25	Yoke	Carbon Steel			
26	Stem Adapter	Carbon Steel			
27	Stud	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
28	Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
29	Washer	Carbon Steel		Stainless Steel	
30	Stud	A193 B7	A320 L7	A193 B8M	A193 B8MLCuN
31	Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
32	Washer	Carbon Steel		Stainless Steel	

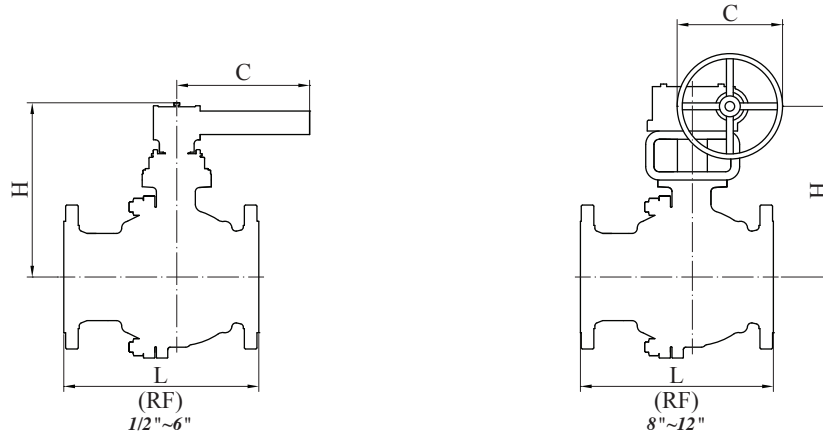
Note: Materials listed are based on typical configurations, other materials can be provided upon request.

* Class 600LB utilize O-ring and gasket for body to cap seal.



Floating Ball Valves-Flanged End

FB Series—Two-piece Forged Steel & Cast Steel Body Ball Valves



150LB

Description		Valve Size							
		1-1/2"	2x1-1/2"	2"	3x2"	2-1/2"	3x2-1/2"	3"	4x3"
Flanged End L	in	6.50	7.00	7.00	8.00	7.52	8.00	8.00	9.00
	mm	165	178	178	203	191	203	203	229
Height H	in	6.34	6.42	6.77	6.77	7.36	7.36	8.23	8.23
	mm	161	163	172	172	187	187	209	209
Handle Length / Handwheel Dia C	in	11.81	11.81	11.81	11.81	11.42	11.81	15.75	15.75
	mm	300	300	300	300	290	300	400	400

Description		Valve Size							
		4"	6x4"	6"	8x6"	8"	10x8"	10"	12x10"
Flanged End L	in	9.00	10.50	15.50	11.50	18.00	13.00	21.00	14.00
	mm	229	267	394	292	457	330	533	356
Height H	in	10.59	10.59	13.74	13.74	16.54	16.54	17.32	17.87
	mm	269	269	349	349	420	420	440	454
Handle Length / Handwheel Dia C	in	23.62	23.62	19.69	19.69	23.62	23.62	23.62	23.62
	mm	600	600	500	500	600	600	600	700

300LB

Description		Valve Size							
		1-1/2"	2x1-1/2"	2"	3x2"	2-1/2"	3x2-1/2"	3"	4x3"
Flanged End L	in	7.52	8.50	8.50	11.14	9.49	11.14	11.14	12.01
	mm	191	216	216	283	241	283	283	305
Height H	in	6.46	6.42	6.77	6.77	7.68	7.68	8.46	8.46
	mm	164	163	172	172	195	195	215	215
Handle Length / Handwheel Dia C	in	11.81	11.81	11.81	11.81	11.81	11.81	15.75	15.75
	mm	300	300	300	300	300	300	400	400

Description		Valve Size							
		4"	6x4"	6"	8x6"	8"	10x8"	10"	
Flanged End L	in	12.01	15.87	15.87	16.50	19.76	17.99	22.36	
	mm	305	403	403	419	502	457	568	
Height H	in	10.59	10.59	13.74	13.74	16.54	16.54	17.91	
	mm	269	269	349	349	420	420	455	
Handle Length / Handwheel Dia C	in	23.62	23.62	19.69	19.69	23.62	23.62	23.62	
	mm	600	600	500	500	600	600	600	

600LB

Description		Valve Size							
		1-1/2"	2x1-1/2"	2"	3x2"	3"	4x3"	4"	6x4"
Flanged End L	in	9.50	11.50	11.50	14.02	14.02	17.01	17.01	22.01
	mm	241	292	292	356	356	432	432	559
Height H	in	6.50	6.50	7.83	7.83	9.76	9.76	11.18	11.18
	mm	165	165	199	199	248	248	284	284
Handle Length / Handwheel Dia C	in	11.81	11.81	15.75	15.75	23.62	23.62	29.53	29.53
	mm	300	300	400	400	600	600	750	750



Floating Ball Valves-Flanged End

FH Series—Two-piece Forged Steel, Pocketless Style Body Ball Valves

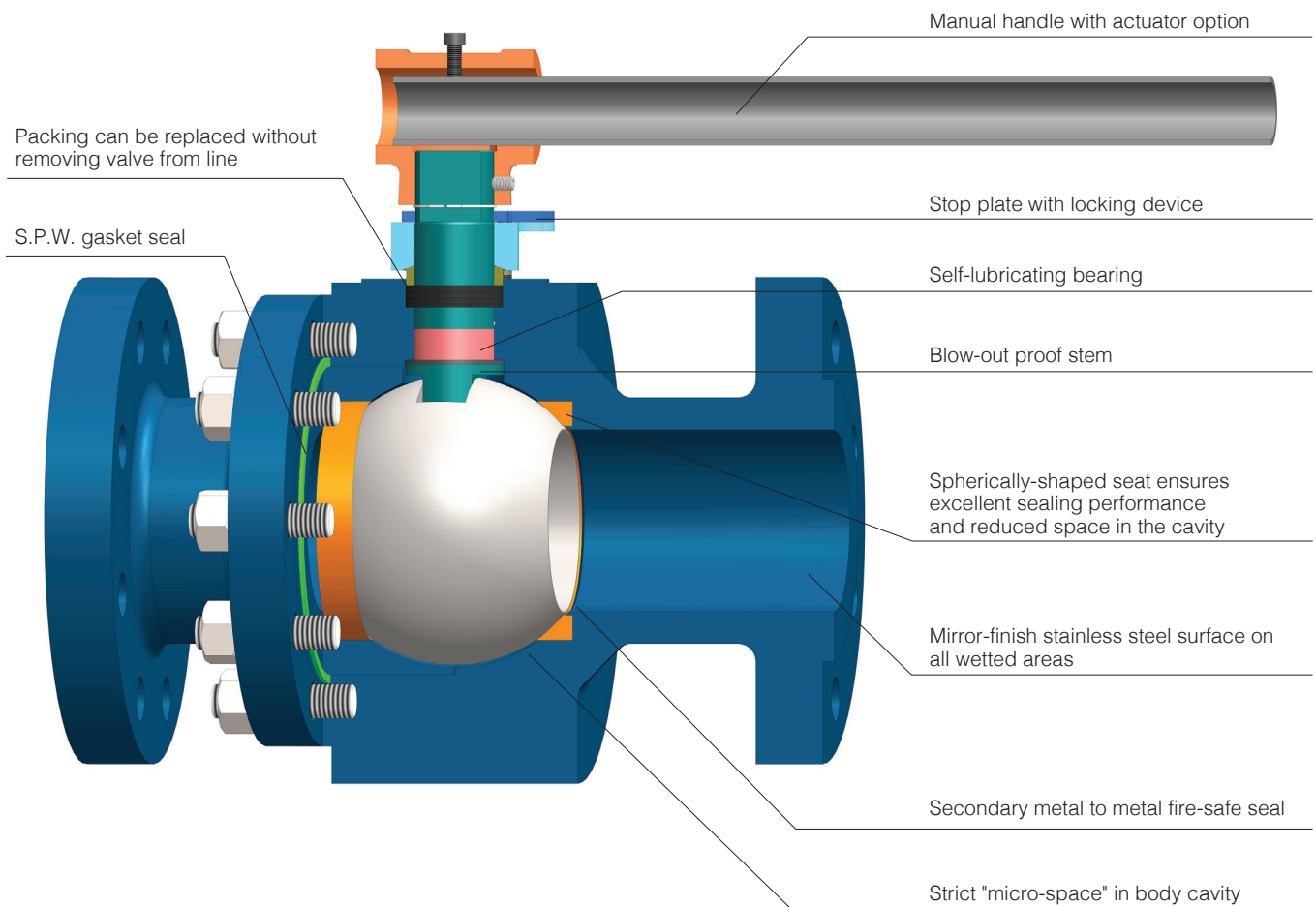
Pocketless Ball Valve Overview

During processing of reactive monomers such as styrene and butadiene to products such as starches and slurries, a common problem is they can build up and polymerize or ferment in the "cavities" or open spaces inside the valves that control the processing. To solve this problem, DHV has developed a uniquely designed pocketless ball valve that does not have fill material in the cavity. Instead, the cavity has been eliminated except for the micro-space required for ball movement.

This is superior technology because the micro-space eliminates areas where product can collect and build up over time. There is no excess material to wear and cause product contamination. All wetted surfaces are stainless steel, polished to a mirror finish. The mirror-finished interior greatly reduces the potential for bonding.

Applications: Styrene, Butadiene, Methylene chloride, Starches, Slurries, Food processing, Fermentation, Pharmaceuticals.

Typical Structure



Note: Picture shown above is typical design, other configurations are available upon request.



Floating Ball Valves-Flanged End

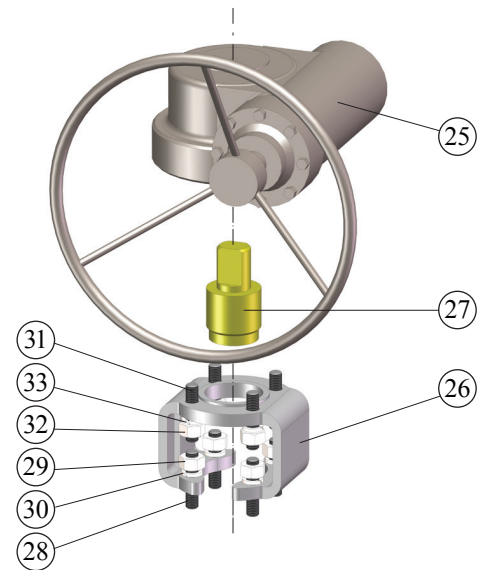
FH Series—Two-piece Forged Steel, Pocketless Style Body Ball Valves

Material Specification

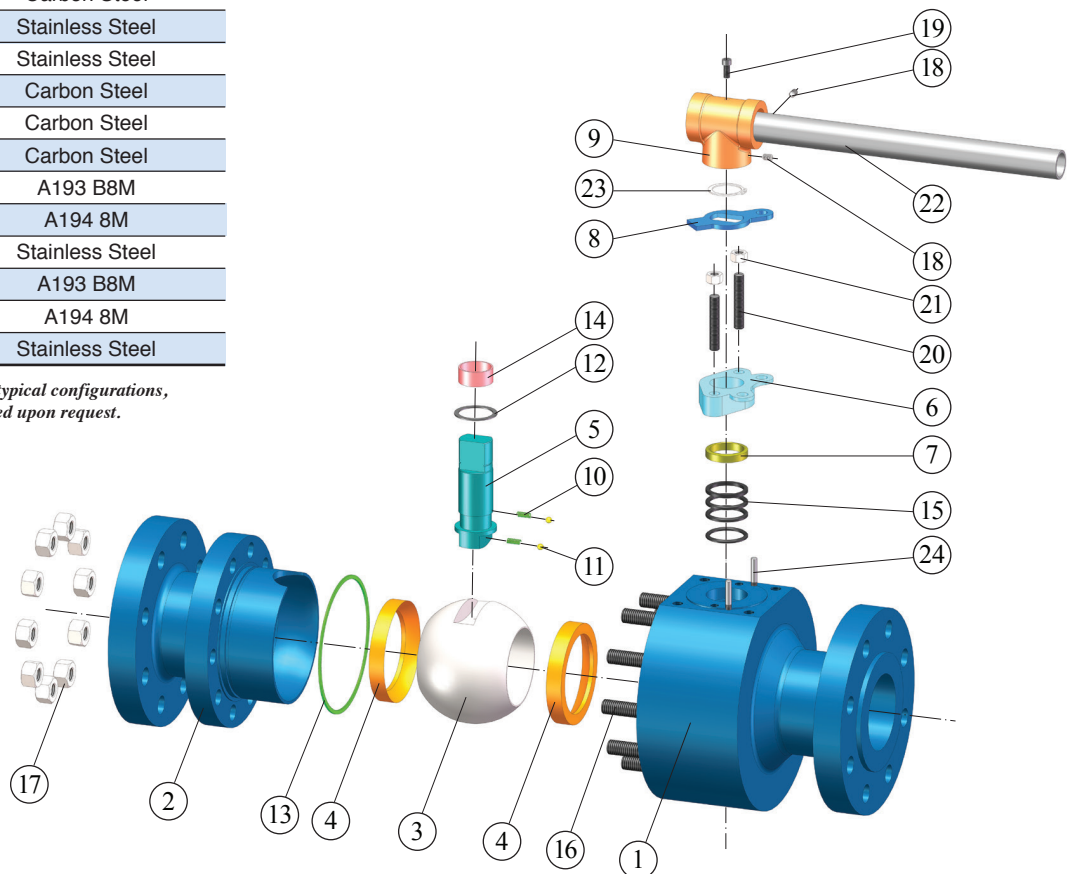
No.	Description	Material
1	Body	A182 F316
2	Cap	A182 F316
3	Ball	A182 F316
4	Seat	PTFE/PEEK
5	Stem	A182 F316 / 17-4PH
6	Packing Gland	A182 F316
7	Packing Ring	A182 F316
8	Stop Plate	Carbon Steel
9	Handle Adapter	Carbon Steel
10	Anti-static Device	Stainless Steel
11	Anti-static Device	Stainless Steel
12	Thrust Washer	PTFE / Metal Backed PTFE
13	Gasket	Metal & Flexible Graphite
14	Bearing	PTFE
15	Packing	PTFE/Graphite
16	Stud	A193 B8M
17	Nut	A194 8M
18	Screw	A193 B8M
19	Bolt	A193 B8M
20	Stud	A193 B8M
21	Nut	A194 8M
22	Handle	Carbon Steel
23	Snap Ring	Stainless Steel
24	Stop Pin	Stainless Steel
25	Gearbox	Carbon Steel
26	Yoke	Carbon Steel
27	Stem Adapter	Carbon Steel
28	Stud	A193 B8M
29	Nut	A194 8M
30	Washer	Stainless Steel
31	Stud	A193 B8M
32	Nut	A194 8M
33	Washer	Stainless Steel

Note: Materials listed are based on typical configurations, other materials can be provided upon request.

Gearbox Operated



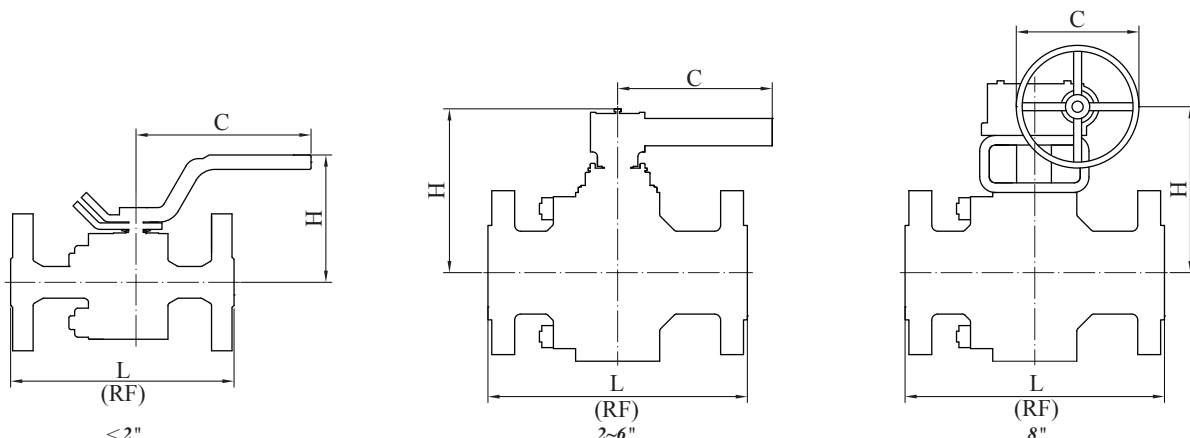
Handle Operated





Floating Ball Valves-Flanged End

FH Series—Two-piece Forged Steel, Pocketless Style Body Ball Valves



150LB

Description		Valve Size									
		1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
Flanged End L	in	4.25	4.61	5.00	6.50	7.01	7.52	7.99	9.02	15.51	17.99
	mm	108	117	127	165	178	191	203	229	394	457
Height H	in	4.17	3.94	3.74	6.61	6.77	7.36	8.23	10.59	13.74	16.54
	mm	106	100	95	168	172	187	209	269	349	420
Handle Length / Handwheel Dia C	in	4.92	6.89	9.84	11.81	11.81	11.81	15.75	23.62	19.69	23.62
	mm	125	175	250	300	300	300	400	600	500	600

300LB

Description		Valve Size									
		1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
Flanged End L	in	5.51	5.98	6.50	8.50	8.50	9.49	11.14	12.01	15.87	19.76
	mm	140	152	165	216	216	241	283	305	403	502
Height H	in	4.17	4.37	3.74	6.61	6.77	7.68	8.46	10.59	13.74	16.54
	mm	106	111	95	168	172	195	215	269	349	420
Handle Length / Handwheel Dia C	in	4.92	6.89	11.81	11.81	11.81	11.81	15.75	23.62	19.69	23.62
	mm	125	175	300	300	300	300	400	600	500	600

600LB

Description		Valve Size							
		1/2"	3/4"	1"	1-1/2"	2"	3"	4"	
Flanged End L	in	6.50	7.52	8.50	9.49	11.50	14.02	17.01	
	mm	165	191	216	241	292	356	432	
Height H	in	4.17	4.37	3.74	6.77	7.68	9.76	11.18	
	mm	106	111	95	172	195	248	284	
Handle Length / Handwheel Dia C	in	4.92	6.89	11.81	11.81	15.75	23.62	29.53	
	mm	125	175	300	300	400	600	750	

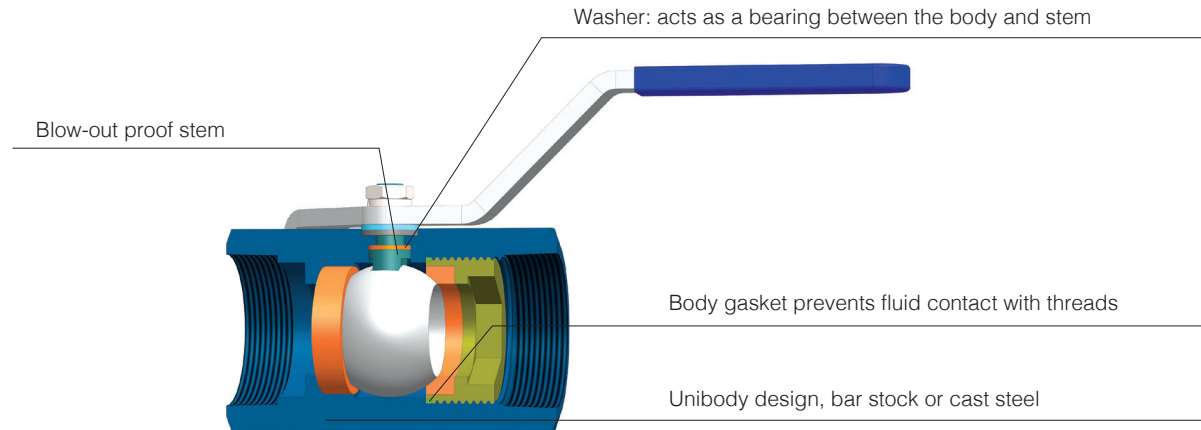


Floating Ball Valves-Threaded & Socket Weld End

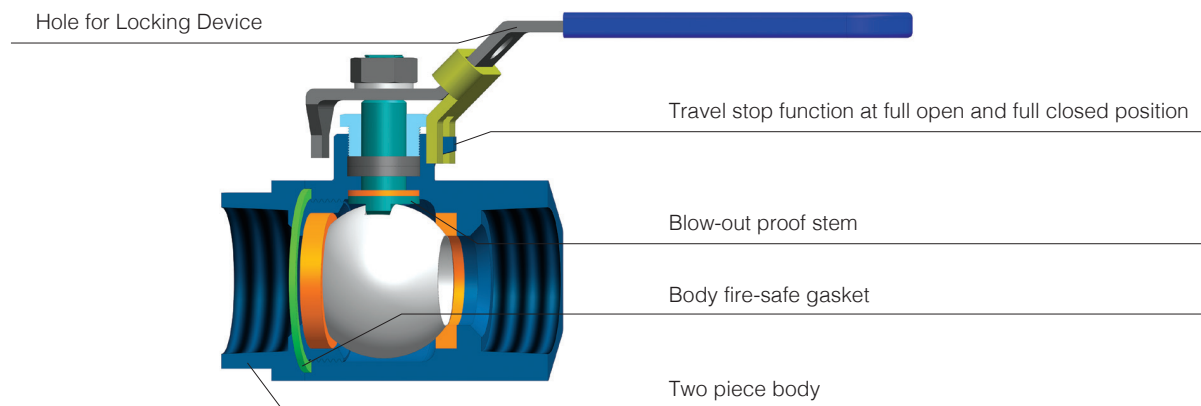
Small Size Ball Valves

Typical Structure

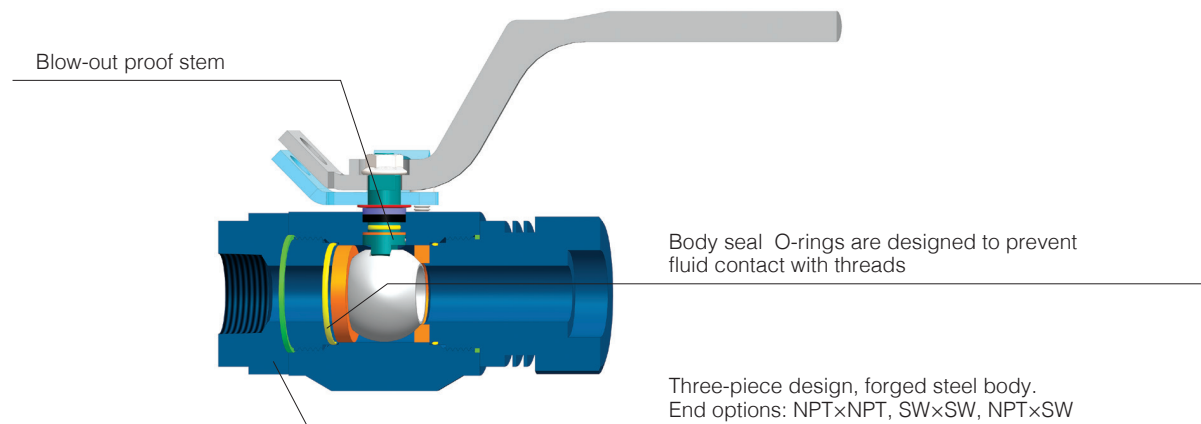
SA1 Series—One-piece Body



SA2 Series—Two-piece Body



SA3 Series—Three-piece Body





Floating Ball Valves-Threaded & Socket Weld End SA1 Series—One-piece Body, Small Size Ball Valves

Applicable Standards

Basic Design: **ASME B16.34**
 End to End: **DHV Standard**
 Threaded End: **ASME B1.20.1 NPT**
 Socket Weld End: **ASME B16.11**
 Test and Inspection: **API 598**

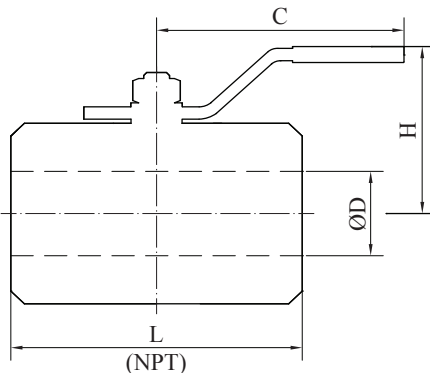
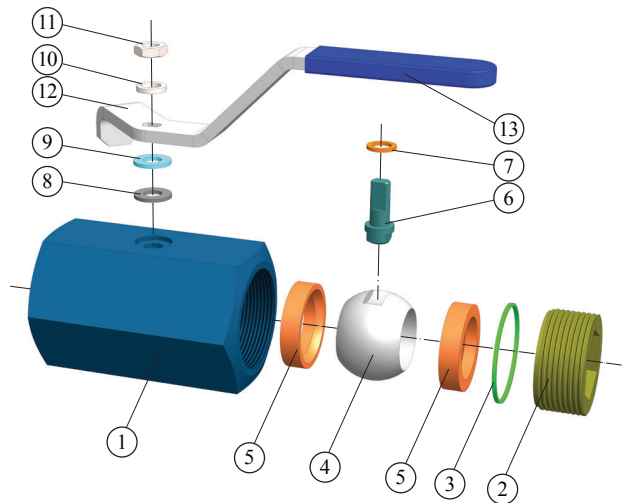
Manufacturing to NACE latest version on request

Note: Valve cannot be socketwelded or modified for socketwelding.



Material Specification

No.	Description	Carbon Steel			Stainless Steel	
1	Body	Bar Stock	A105	A350 LF2	Bar Stock	A182 F316
2	Cap	Bar Stock	A105	A350 LF2	Bar Stock	A182 F316
3	Body Gasket	Metal & Flexible Graphite				
4	Ball	A182 F316				
5	Seat	PTFE / Nylon				
6	Stem	A276 316				
7	Thrust Washer	PTFE				
8	Stem Packing	PTFE				
9	Packing Ring	304SS			316SS	
10	Washer	304SS			316SS	
11	Gland Nut	A194 2H		A194 7	A194 8M	
12	Lever	Carbon Steel				
13	Plastic Cover	Plastic				



Dimensions

2000WOG / 800LB

Description		Valve Size							
		1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
Bore size D	in	0.20	0.28	0.37	0.49	0.59	0.79	0.98	1.26
	mm	5	7	9.5	12.5	15	20	25	32
Threaded End L	in	1.69	1.77	2.44	2.76	3.37	3.70	4.00	4.49
	mm	43	45	62	70	85.5	94	101.5	114
Height H	in	1.38	1.50	1.97	2.28	2.44	2.52	2.83	3.15
	mm	35	38	50	58	62	64	72	80
Lever Length C	in	2.87	2.87	4.53	4.53	5.08	5.08	5.91	5.91
	mm	73	73	115	115	129	129	150	150



Floating Ball Valves-Threaded & Socket Weld End

SA2 Series—Two-piece Body, Small Size Ball Valves

Applicable Standards

Basic Design: **ASME B16.34**

End to End: **DHV Standard**

Threaded End: **ASME B1.20.1 NPT**

Socket Weld End: **ASME B16.11**

Test and Inspection: **API 598**

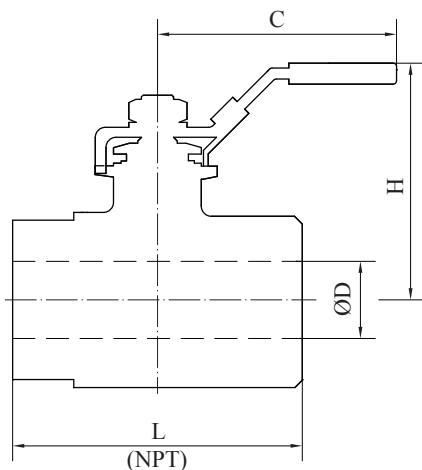
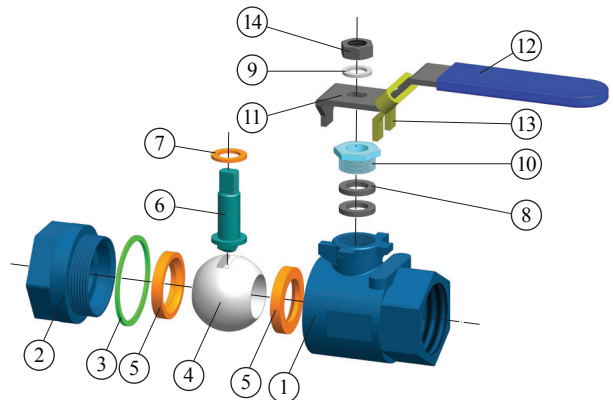
Manufacturing to NACE latest version on request

Note: Valve cannot be socketwelded or modified for socketwelding.



Material Specification

No.	Description	Carbon Steel			Stainless Steel	
1	Body	Bar Stock	A105	A350 LF2	Bar Stock	A182 F316
2	Cap	Bar Stock	A105	A350 LF2	Bar Stock	A182 F316
3	Body Gasket	Metal & Flexible Graphite				
4	Ball	A182 F316				
5	Seat	PTFE / Nylon				
6	Stem	A276 316				
7	Thrust Washer	PTFE				
8	Stem Packing	PTFE				
9	Washer	304SS			316SS	
10	Gland Nut	A194 2H		A194 7	A194 8M	
11	Lever	Carbon Steel				
12	Plastic Cover	Plastic				
13	Locking Device	Carbon Steel				
14	Nut	304SS				



Dimensions

2000WOG / 800LB

Description		Valve Size							
		1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
Bore size D	in	0.37	0.37	0.50	0.69	0.87	1.00	1.25	1.50
	mm	9.5	9.5	12.7	17.5	22.2	25.4	31.7	38
Threaded End L	in	2.13	2.17	2.48	2.83	3.41	3.66	4.04	4.69
	mm	54	55	63	72	86.7	93	102.5	119
Height H	in	1.63	1.69	1.83	2.20	2.44	2.60	2.95	3.15
	mm	41.5	43	46.5	56	62	66	75	80
Lever Length C	in	4.33	4.33	4.33	5.94	5.94	6.69	7.40	7.40
	mm	110	110	110	151	151	170	188	188

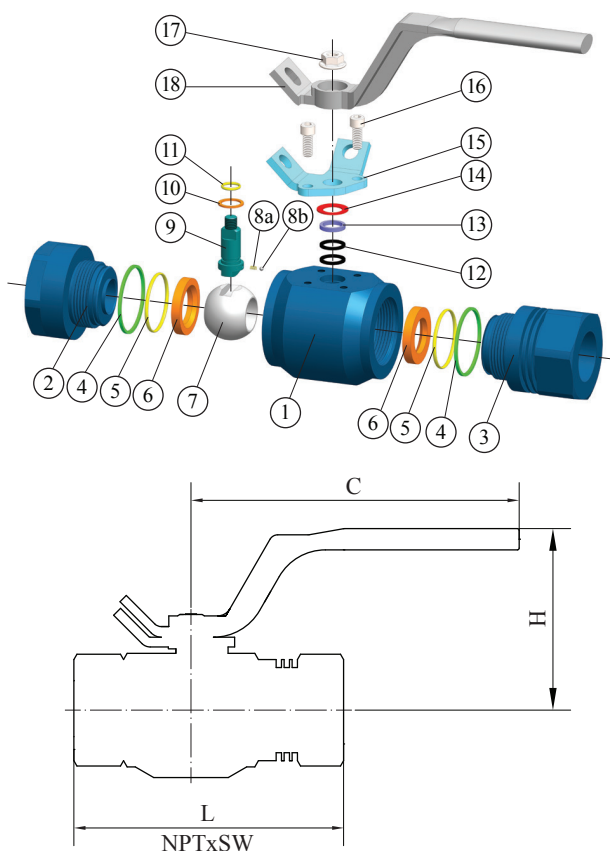


Floating Ball Valves-Threaded & Socket Weld End

SA3 Series—Three-piece Body, Small Size Ball Valves

Applicable Standards

Basic Design: **ISO 17292**
 End to End: **DHV Standard**
 Threaded End: **ASME B1.20.1 NPT**
 Socket Weld End: **ASME B16.11**
 Test and Inspection: **API 598**
 Fire-safe Test: **API 607**
 Manufacturing to NACE latest version on request



Material Specification

No.	Description	Carbon Steel		Stainless Steel	
1	Body	A105	A350 LF2	A182 F316	A182 F51
2	Threaded Cap	A105	A350 LF2	A182 F316	A182 F51
3	Socket Weld Cap	A105	A350 LF2	A182 F316	A182 F51
4	Body Gasket	Metal & Flexible Graphite			
5	O-Ring	Viton / HNBR			
6	Seat	Delrin / Devlon / Peek			
7	Ball	A182 F316 / 17-4PH			A182 F51
8a	Anti-Static Device	Stainless Steel			
8b	Anti-Static Device	Stainless Steel			
9	Stem	17-4PH / Nitronic 50			A182 F51
10	Thrust Washer	PEEK			
11	O-Ring	Viton / HNBR			
12	Stem Packing	Graphite			
13	Packing Ring	A182 F316			A182 F51
14	Disc Spring	Stainless Steel			
15	Packing Gland	A105	A350 LF2	A182 F316	A182 F51
16	Bolt	Stainless Steel			
17	Nut	A194 2H	A194 7	A194 8M	A194 8MLCuNa
18	Lever	Carbon Steel			

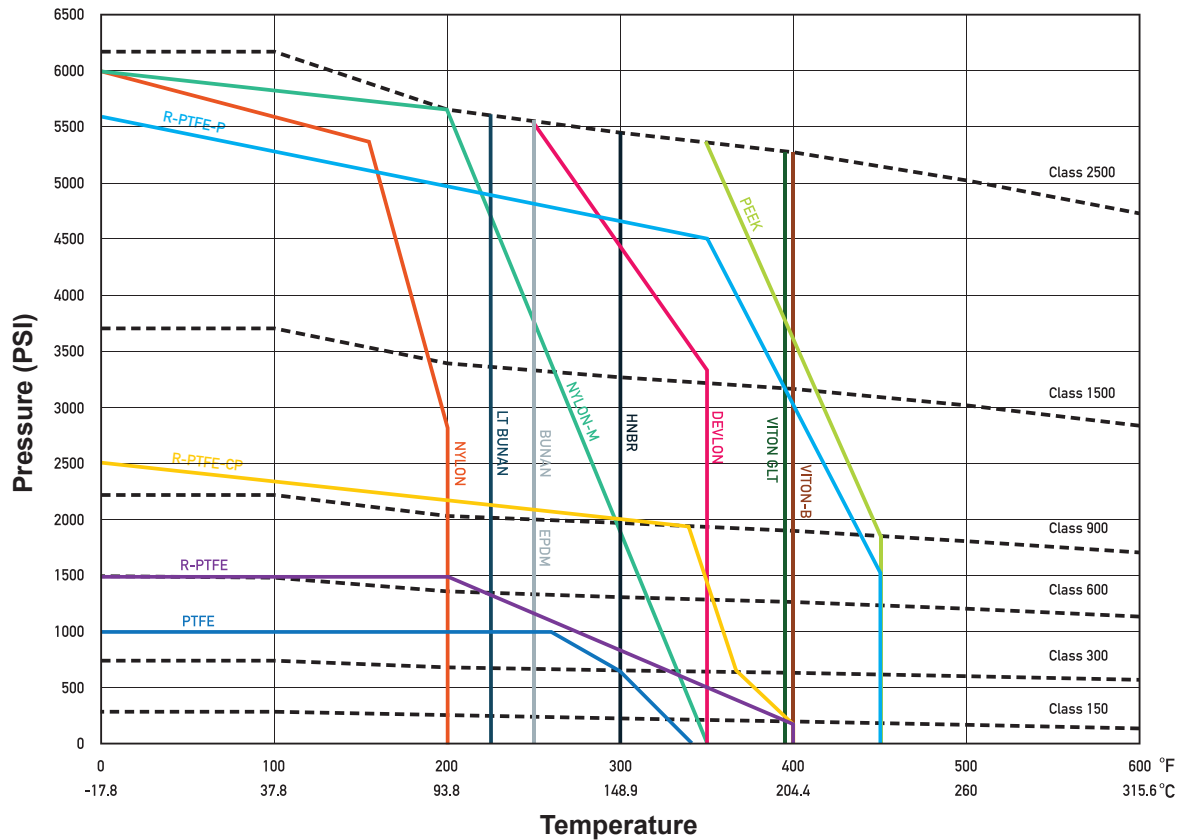
Dimensions

3000WOG										6000WOG						
Description		Valve Size								Valve Size						
		3/4x1/2"	1x3/4"	2x1-1/2"	3x2"	1/2"	3/4"	1-1/2"	2"	3/4x1/2"	1x3/4"	2x1-1/2"	1/2"	3/4"	1-1/2"	2"
Bore size	in	0.50	0.88	1.50	2.00	0.50	0.88	1.50	2.00	0.50	0.88	1.50	0.50	0.88	1.50	2.00
	mm	13	22	38	51	13	22	38	51	13	22	38	13	22	38	51
FNPTxSW L	in	5.56	5.50	7.40	11.38	4.44	5.50	7.40	9.50	5.56	6.00	7.90	4.69	5.50	7.40	9.50
	mm	141	140	188	289	113	140	188	241	141	152	201	119	140	188	241
Height H	in	3.29	4.40	5.62	6.96	3.29	4.40	5.62	6.96	3.29	4.40	5.62	3.29	4.40	5.62	6.96
	mm	83	112	143	177	83	112	143	177	83	112	143	83	112	143	177
Lever Length C	in	4.82	6.75	11.00	11.88	4.82	6.75	11.00	11.88	4.82	6.75	11.00	4.82	6.75	11.00	11.88
	mm	122	172	279	302	122	172	279	302	122	172	279	122	172	279	302



Materials Pressure-Temperature Chart

Pressure-Temperature Chart



Note: R-PTFE-P = PEEK + PTFE R-PTFE-CP = PEEK + RPTFE
Please consult with a DHV representative for further details.

Low Temperature Limits

Body Material	°F	°C
WCB/WCC/A105	-20	-29
LCB/LCC/LF2	-50	-46
CF8M/F316	-320	-196
CF8/F304	-320	-196

O-Ring Material	°F	°C
VITON B	-20	-29
VITON GLT	-50	-46
BUNA N	-15	-26
EPDM	-60	-51
AFLAS	+32	0
HNBR (ED Resistant)	-50	-46

Seat Material	°F	°C
R-PTFE	-100	-73
R-PTFE-P	-100	-73
R-PTFE-CP	-100	-73
NYLON(PA12)	-50	-46
NYLON-M	-20	-29
PTFE	-100	-73
PEEK	-148	-100
DEVLON	-50	-46



Terms & Conditions

1. DEFINITIONS

(a) "The CONTRACT" - The General Conditions of Orders together with COMPANY'S quote and any exhibits, attachments and other documents incorporated by reference.

(b) "The PRODUCT'S" - valves and related products and services as well as their packaging that form the subject-matter of the CONTRACT.

(c) "The COMPANY" - DHV Industries, Inc. or DHV Valve Company, Inc. or alternatively any affiliated company named in COMPANY'S quotation.

(d) "The CUSTOMER" - The individual, firm, partnership, company or other party with whom the Company contracts.

(e) "FORCE MAJEURE" - Any cause or circumstances (including but not limited to, act of God, fire, storm, flood, drought, earthquake, malicious damage, shortage of material, manufacturer's inability to provide the Product, embargo, riot, strike, lock-out, trade dispute, civil disturbance, war, compliance with any law or government order, rule or direction or any other event or accident) beyond the reasonable and direct control of COMPANY.

2. SCOPE

(a) These General Conditions set out the standard terms on which the COMPANY supplies PRODUCTS to the CUSTOMER. Accordingly, these General Conditions apply to all quotations and sales unless otherwise agreed in writing.

(b) The legality, validity, and enforceability of other clauses in these General Conditions will not be affected if one of the clauses is, or becomes illegal, invalid, or unenforceable.

(c) We reserve the right to institute changes in material, design and specification without notice.

3. QUOTATIONS AND ORDERS

(a) Unless otherwise expressly stipulated, all of the COMPANY'S quotations and prices are subject to change without notice, and to availability. Prices are valid only for the duration indicated in the quotation and are subject to change without notice.

(b) Any written or oral purchase order received from the CUSTOMER by the COMPANY ("Order") shall be interpreted as a written acceptance of the COMPANY'S offer to sell, and shall be filled in accordance with the terms and conditions of the sale set forth herein. The terms and conditions of the Company's proposal (if at all any) shall prevail over any conflicting or different terms in CUSTOMER'S orders unless the CUSTOMER notifies the COMPANY in writing of its objections thereto within the earlier of the date of shipment of the Product or fifteen (15) days from receipt of COMPANY'S General Conditions. CUSTOMER'S standard terms of purchase will not be considered as a counter-offer to COMPANY'S terms and conditions of sale. The COMPANY will not be bound by conflicting purchasing conditions or reservations made by the CUSTOMER even if the COMPANY does not explicitly contradict the conditions or reservations.

(c) No order in pursuance of any quotation or otherwise shall be binding on the COMPANY unless and until such an order is accepted by the COMPANY. The COMPANY may reject any order in whole or part. A contract between the COMPANY and CUSTOMER is finalized once the COMPANY issues a telephonic, electronic, or written order confirmation to the CUSTOMER or ships the Product to the CUSTOMER. Except as otherwise specifically provided herein, the Order is the final and complete expression of the agreement between the parties, setting forth the entire agreement between the parties regarding this transaction and including all promises and representations both express and implied. Any matters not contained herein, or otherwise referenced or incorporated herein, are not part of the Order.

(d) Subject to the specific procedures for changes to the Order, none of the terms and conditions contained herein may be added to, modified, superseded, or otherwise altered except by a written instrument specifically referencing the affected provision of the Order signed by the President or Vice President of the COMPANY.

4. PRICES

(a) All prices shown are in U.S. dollars and are F.O.B. COMPANY'S shipping point, unless otherwise expressly agreed to by COMPANY.

(b) Prices exclude any duties, federal, state or local taxes or other government charges and delivery costs, which the CUSTOMER must pay unless the law specifically provides that the COMPANY must make such payment in which case the CUSTOMER shall reimburse the COMPANY for such payments as part of the purchase price. All prices include the COMPANY'S

standard packing, but not pallets or crating for export goods.

5. PAYMENTS AND LICENSES

(a) Payment must be made in the currency specified in COMPANY'S invoice.

(b) The CUSTOMER must pay the full invoice amount before the shipment from the date of the invoice unless otherwise agreed in writing. The COMPANY is entitled to charge interest on overdue payments at the greater of the following two rates: (a) 1.5% monthly or (b) 2% annually above the current monthly base rate of the COMPANY'S bank. In no event shall the interest rate be higher than the maximum rate permitted by applicable law.

(c) In addition to exercising its rights at common law or under statute, the COMPANY is entitled to terminate the CONTRACT by written notice to the CUSTOMER if the CUSTOMER is in material breach of its obligations under the CONTRACT or any other agreements with the COMPANY. The CUSTOMER is in material breach:

- If it fails to meet its liabilities when they fall due;
- If it seeks a composition with its creditors;
- If all or part of its property is subject to receivership; or
- If a petition for liquidation, winding-up or administration is filed in respect of the CUSTOMER.

(d) The CUSTOMER is not entitled to withhold, set off or deduct claims against the COMPANY from an amount that it owes the COMPANY under the CONTRACT or other agreement with the COMPANY.

(e) The COMPANY is obligated to deliver a PRODUCT only if the CUSTOMER has made due payment of all amounts that it owes to the COMPANY at the date of delivery under the CONTRACT or other agreement with the COMPANY. The COMPANY is entitled to suspend delivery of a PRODUCT if the CUSTOMER is in default without this affecting the COMPANY'S other rights under the CONTRACT or other agreement with the CUSTOMER. The COMPANY is not obligated to resume deliveries until the CUSTOMER has paid all overdue amounts, including all expenses and accrued interest.

(f) It is the CUSTOMER'S exclusive responsibility to obtain all licenses, exchange control documents and other consents needed for the import and use of the PRODUCTS as well as for payment of the PRODUCTS. The CUSTOMER will not be discharged from his obligations under these General Conditions because he fails to obtain a license or other consents.

6. DELIVERY AND FORCE MAJEURE

(a) While the COMPANY will endeavor to deliver the PRODUCTS by any date or within any period agreed upon, such dates and periods are estimates only given in good faith and the COMPANY will not be liable for any failure to deliver by such date or within such a period. Time for delivery shall not be of the essence of the CONTRACT.

(b) Should the COMPANY be delayed in or prevented from making the delivery of the PRODUCTS due to Force Majeure, the COMPANY may terminate the CONTRACT or suspend the Order without incurring any liability for any loss or damage arising there from, but without prejudice in any such case to rights accrued to the COMPANY for deliveries already made.

(c) Unless otherwise agreed to in writing by the COMPANY, the COMPANY shall deliver the PRODUCTS by the means most convenient to the COMPANY to the address or addresses specified by the CUSTOMER at the time of placing the Order or (in the event that the CUSTOMER fails so to specify an address) to an address at which the CUSTOMER resided or carries on business. The PRODUCTS are considered to be delivered when they are physically handed over to 1) the CUSTOMER, 2) the CUSTOMER'S agent or a person that the CUSTOMER has authorized to take delivery, or (3) the carrier, regardless of who pays shipping costs. The COMPANY shall be entitled to add to the contract price a reasonable charge for packaging, delivery and insurance. Off-loading will be at CUSTOMER'S expense.

(d) The CUSTOMER is obligated to pay all costs that the COMPANY incurs because of the CUSTOMER'S failure to take delivery either 1) on the date stated in the invoice or the COMPANY'S confirmation, or 2) when the PRODUCTS are ready, if the COMPANY has notified the CUSTOMER in writing of their readiness and the CUSTOMER has not taken delivery within seven days or any period to which the parties agree.

(e) If the COMPANY is responsible for delivery, the CUSTOMER must thoroughly inspect the PRODUCTS sent at the COMPANY'S risk. The CUSTOMER is to notify the COMPANY in writing immediately of loss, damage or shortage of PRODUCTS. If the CUSTOMER does not receive the PRODUCTS on the agreed date of delivery, it is to notify the COMPANY within 48 hours of the agreed date of delivery. The COMPANY disclaims all liability, and the CUSTOMER waives its rights of recovery, under this provision unless the CUSTOMER'S information is sufficient to



Terms & Conditions

allow the COMPANY to make a valid claim against the carrier of the PRODUCTS for their loss or damage.

(f) If the CUSTOMER is responsible for delivery, the COMPANY will not be responsible for delays or failure to deliver by the carrier set up by the CUSTOMER or due to causes beyond the COMPANY control. Delivery of material to a common carrier shall be considered delivery to the Buyer. Claims for loss or any damage to material in transit shall be filed by the Buyer direct with the carrier. Claims for any shortage, corrections or deductions must be made in writing within 48 hours after receipt of goods.

7. PASSING OF RISK AND TITLE, CANCELLATION AND RETURNS

The COMPANY'S liability for the PRODUCTS passes from the COMPANY to the CUSTOMER on the earlier of the following two dates: 1) the date when the PRODUCTS are delivered to the CUSTOMER, the CUSTOMER'S agent, or a person that the CUSTOMER has authorized to accept delivery, or 2) the agreed date of delivery, if the CUSTOMER fails to take delivery as required.

(a) Under the CONTRACT.

(b) The COMPANY remains the owner of the PRODUCTS until it receives full payment for all PRODUCTS whether or not the PRODUCTS are delivered to the CUSTOMER. If the CUSTOMER sells the PRODUCTS to a third party before the COMPANY receives full payment, the proceeds of the sale shall first apply to pay all amounts due to the COMPANY. The COMPANY or its representative is entitled to recover or resell the PRODUCTS and to enter the CUSTOMER'S premises for that purpose, without this affecting its other rights; if the CUSTOMER has not paid the full purchase price or if insolvency proceedings are commenced against the CUSTOMER.

(c) Purchase Orders once placed by CUSTOMER and accepted by COMPANY can be cancelled only with COMPANY'S written consent and upon terms which will save COMPANY from loss. No PRODUCTS may be returned for credit or adjustment without written permission from COMPANY'S officer authorized to issue such permission.

(d) All sales are final. This means that the CUSTOMER is not entitled to credit for returned PRODUCTS whether or not the CUSTOMER has made a complaint or a claim. If the Company expressly agrees in writing that the COMPANY will credit the CUSTOMER for returned PRODUCTS, the CUSTOMER must return the PRODUCTS promptly, carriage-paid, and in the COMPANY'S opinion in good condition to receive the credit. If the COMPANY expressly agrees in writing that the CUSTOMER can return the PRODUCTS, cancel order or change order, the CUSTOMER will be charged for work performed, based on the following schedule. All freight for return or cancelled/changed goods shall be prepaid by CUSTOMER.

- Twenty Five (25%) percent of price on stock items.
- Fifty (50%) percent of price of stock items ordered in quantities which exceed normal inventory levels.
- Twenty Five (25%) percent of price prior to drawing submittal on made to order items.
- Forty (40%) percent on drawing approval, but prior to start of castings.
- Seventy (70%) percent during casting cycle, dependent on the state of completion.
- One Hundred (100%) percent on castings that are not standard materials used by COMPANY in daily sales; i.e. Stainless Steel, Duplex, Nickel, etc.
- Eighty (80%) during machining and assembly operations, this is dependent on the state of completion.
- One Hundred (100%) percent after final assembly and test.
- Special Product Orders: or non standard products are not subject to any schedule level of cancellation, except on such terms as COMPANY may specify on application only.

8. WARRANTY AND LIMITATIONS OF LIABILITY

(a) As to all PRODUCTS sold hereunder, the COMPANY expresses no warranties whatsoever but only assigns to CUSTOMER all transferable warranties and remedies granted by the manufacturer of such PRODUCTS to which COMPANY is entitled and CUSTOMER agrees to look solely to such manufacturers with regard to claims and remedies relating to such PRODUCTS. THE COMPANY SPECIFICALLY DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND SATISFACTORY QUALITY. THE COMPANY MAKES NO WARRANTIES AND REPRESENTATIONS, AS TO QUALITY, CAPABILITIES, OPERATIONS, NONINFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS, PERFORMANCE AND SUITABILITY OF THE PRODUCTS.

(b) LIMITATION OF LIABILITY. CUSTOMER'S EXCLUSIVE REMEDY AGAINST COMPANY FOR DEFECTS IN THE PRODUCTS IS THE MANUFACTURER'S WARRANTY SET FORTH IN SECTION 8 (a). THE PARTIES AGREE THAT UNDER NO CIRCUMSTANCE SHALL THE

COMPANY HAVE ANY LIABILITY WHATSOEVER FOR ANY CLAIM ARISING FROM OR RELATING TO THE ORDERS OR THE PRODUCTS FOR AN AGGREGATE AMOUNT IN EXCESS OF THE INVOICED PRICE FOR THE PRODUCTS.

(c) The COMPANY shall not be liable for any damage resulting from delays, failure of the PRODUCTS, loss of profit or revenues, loss of time or loss of use, cost of capital, diminution of goodwill, or claims of CUSTOMER'S customers.

(d) IN NO CIRCUMSTANCES WILL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, PUNITIVE OR INDIRECT LOSS OR DAMAGE WHATSOEVER.

(e) The COMPANY is not liable if the CUSTOMER'S use of the PRODUCTS infringes on a third party's patent rights.

(f) Any exclusions or limitations of liability in this CONTRACT in favor of the COMPANY are agreed to be extended for the benefit of all COMPANY'S and/or individuals within the COMPANY'S group of COMPANIES. The CUSTOMER agrees in the appointment of the COMPANY as its agent or trustee solely for the extension of the benefit of the exclusions and limitations of liability. All duties, liabilities and obligations that would otherwise result from this agency are expressly excluded.

(g) The COMPANY warrants the PRODUCTS provided to the original CUSTOMER, not any third party, for a period of one year after date of shipment, that PRODUCTS will be free from defects in materials and workmanship under proper and normal installation and use. Any claim for defect goods should be by written notice to the COMPANY immediately upon discovery. NO warranty shall apply to PRODUCTS which has been modified or changed in design or function, misused, or improperly maintained. The COMPANY shall be able to inspect claimed defects at original CUSTOMER's facility to determine its obligation. Without written authorization of COMPANY, any repair labor or material is not allowed. No PRODUCTS may be returned without written permission from COMPANY.

9. SPECIFICATION, INSTRUCTIONS AND/OR DESIGN

If PRODUCTS are modified to a specification, instruction or design supplied by CUSTOMER or any third party on behalf of CUSTOMER, then:

(a) The suitability and accuracy of that specification, instruction and/or design will be CUSTOMER'S responsibility.

(b) The CUSTOMER will indemnify COMPANY against any infringement or alleged infringement of any third party's intellectual property rights including but not limited to patent, design right, registered design, trademark, trade name or copyright and any loss, damage or expense which it may incur by reason of any such infringement or alleged infringement in any county, and

(c) The CUSTOMER will indemnify COMPANY against any loss, damage or expense in respect of any liability arising in any country by reasons of the PRODUCTS being made to such specification, instruction or design.

10. CHOICE OF LAW AND JURISDICTION

(a) The laws of the State of California, including the Uniform Commercial Code, shall govern this CONTRACT. Jurisdiction and venue shall be the Superior Court of Kern County, Bakersfield, California. However, the CUSTOMER expressly agrees that the COMPANY may take action in another jurisdiction to obtain security for the COMPANY'S claims under the CONTRACT.

(b) The CONTRACT constitutes the entire agreement between the COMPANY and the CUSTOMER concerning the supply of the PRODUCTS. The CUSTOMER agrees that he has no other rights of recourse to the COMPANY other than those expressly stated in these General Conditions. The General Conditions apply whether or not the CUSTOMER has a cause of action because the COMPANY or its representative has acted negligently.

11. ATTORNEY'S FEES

In the event of any litigation or arbitration or any quasi-judicial or administrative proceeding involving the parties hereto to enforce any provision of this Agreement, to enforce any remedy available upon default hereunder, or seeking a declaration of the rights of either party hereunder, the prevailing party shall be entitled to recover from the other such attorney's fees and costs as may be reasonably incurred, including the costs of reasonable investigation, preparation and professional or expert consultation incurred by reason of such litigation, arbitration or proceeding. Sums actually expended in the prosecution or defense of any litigation, arbitration or proceeding within the meaning of the foregoing sentence shall be prima facie evidence of reasonable attorneys' fees, costs and disbursements.

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DHV reserves the right to discontinue the manufacture or change and modify our design and construction of any DHV product, in due course of our manufacturing procedure without incurring any obligation to accept for credit, to replace or furnish or install such changes or modifications on products previously or subsequently sold.



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