How to Order

Specifying PBV® Flanged Floating Ball Valve Figure Numbers

Example: C-6410-31-2236-FT-NL-I This number represents a Carbon Steel, Full Port, Two-piece Body, Stem Packed Flanged Floating Type, Class 150 Ball Valve, Fire Tested, with Raised Face End Connections, WCB Body with 316 Stainless Steel Trim, Virgin TFM Seats, PTFE Seals, NACE Compliance, Lever Operated with ISO 5211 Mounting Pad.

C - 6 4 10 - 3 1 - 22 36 - F T - N L - I

Mat. Code	Port Config.	Valve Type	Press. Class	Fire Tested	End Conn.	Body Mat.	Trim Mat.	Seat Mat.	Stem Seal Mat.	NACE Option	Operator	Design	Modifier Code
C Carbon Steel **S** Stainless Steel	**4** Reduced Port 2 Pc. Body **5** Reduced Port Unibody **6** Full Port 2 Pc. Body	**4** Stem Packing Flanged Floating Type **5** O-Ring Stem Flanged Floating Type	**10** 150 CL **30** 300 CL **60** 600 CL	**3** Fire Tested	**1** RF **3** RTJ **2** Non-Std. per EDS-11	**22** WCB **28** LCC **36** CF8M	**00** Same as Body **36** 316SS **71** Monel® **73** Hastelloy®	**C** Carbon Filled TFMC **D** Devlon® **F** Virgin TFM **G** Glass Filled PTFE **N** Nylon **P** PEEK™ **Z** Metal Seats	**T** PTFE **Y** Viton® GF **E** EPDM **L** Graphite **W*** Viton® B **H*** HNBR*	**N** NACE **S** Non NACE	**L** Lever **G** Gear Operator **B** Bare Stem **A** Actuator	**I** ISO 5211 Mounting Pad	**XXX**

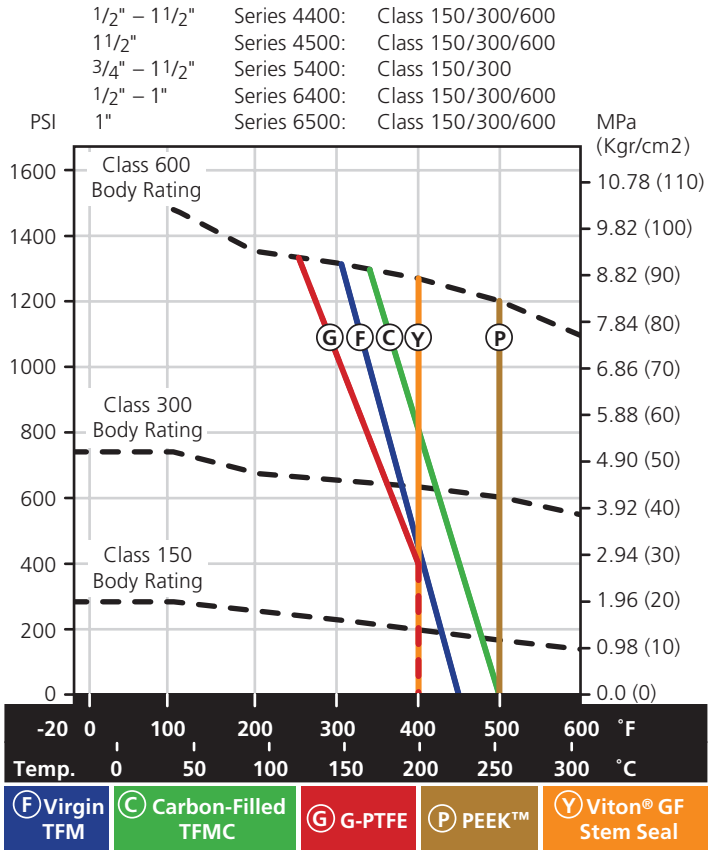
Note: *ED resistant o-ring seals for 4500/6500 series.

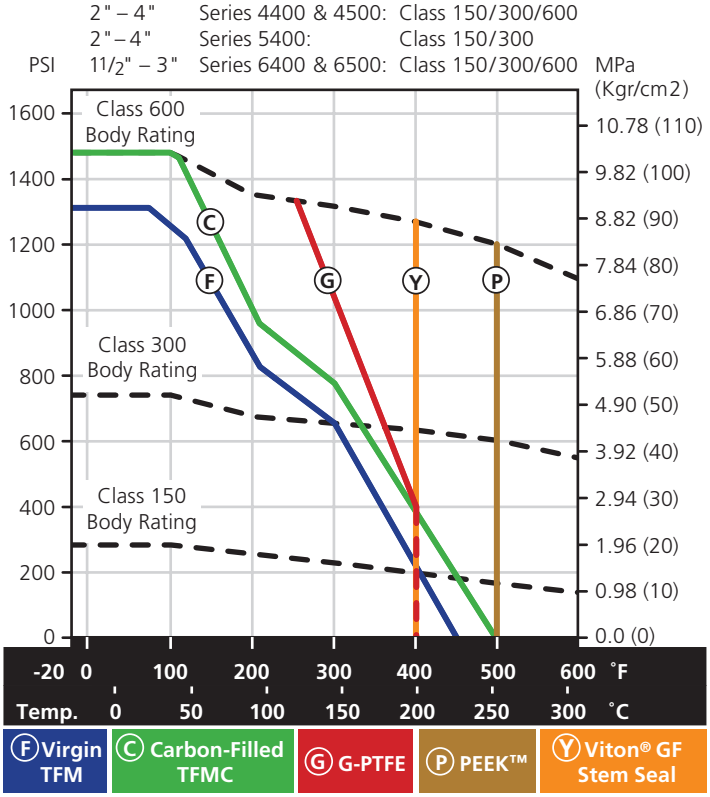
FET's PBV® Valve Brand Family of Flanged Floating Ball Valve Products

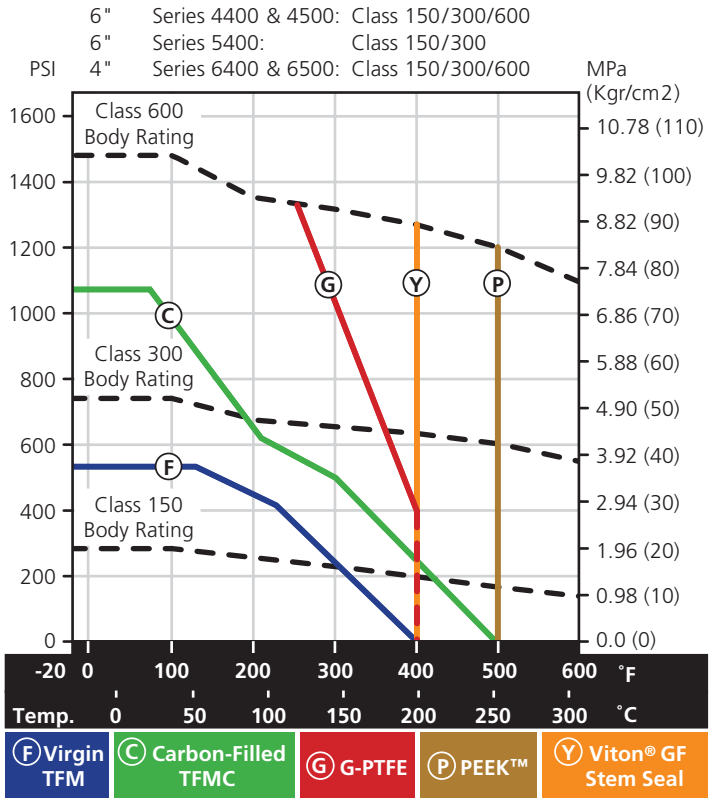
To learn more about this product line and other PBV® valve products for on and offshore oilfield and industrial applications, visit our website at www.f-e-t.com.

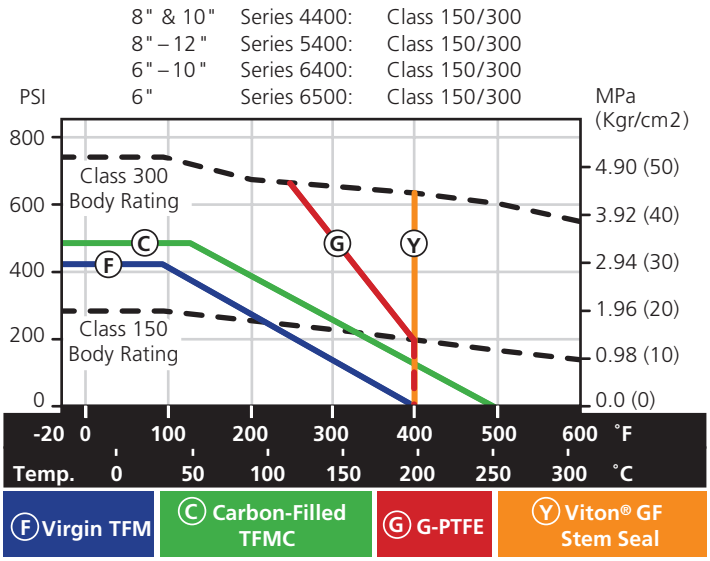
Pressure Temperature Ratings

The pressure temperature ratings for PBV®'s Flanged Floating Ball Valves are determined by the body material, seal material and the seat material rating. The charts below are indicative of the standard seat materials. For ratings of other materials, contact your PBV® customer service representative.









Maximum Stem Break Torque at Various Pressures

Use the chart below to locate the curve number for the valve series, valve class and valve size. Locate the curve number on the chart to the right. Find the valve design pressure on the horizontal axis and read up until you intersect the selected curve number. Read across horizontally to find the maximum break torque.

Example: for a 2" Series 6400 Class 150 valve at 200 psi: Use curve #5 from the table below. The intersection of curve #5 and 200 psi results in 1205 in./lbs. maximum break torque.

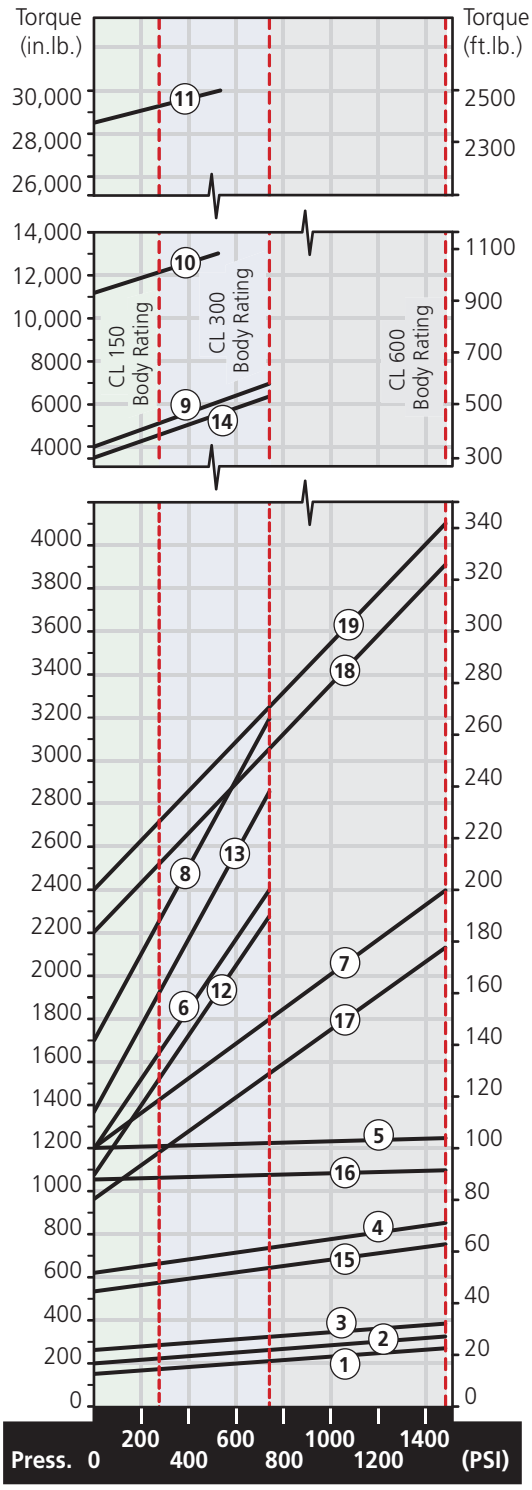
Valve Curve Numbers

Ser.	Size (in.)										
	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12
Class 150											
4400	—	—	—	—	4	5	6	8	9	10	—
4500	—	—	—	3	15	16	12	13	—	—	—
5400	—	1	2	3	4	5	6	8	9	10	11
6400	1	2	3	4	5	6	8	9	10	11	—
6500	—	—	3	15	16	12	13	14	—	—	—
Class 300											
4400	—	—	—	—	4	5	6	8	9	10	—
4500	—	—	2	3	15	16	12	13	—	—	—
5400	—	1	2	3	4	5	6	8	9	10	11
6400	1	2	3	4	5	6	8	9	10	11	—
6500	—	—	3	15	16	12	13	14	—	—	—
Class 600											
4400	—	1	2	3	4	5	7	19	—	—	—
4500	—	—	—	3	15	16	17	18	—	—	—
6400	1	2	3	4	5	7	19	—	—	—	—
6500	—	—	3	15	16	17	18	—	—	—	—

Max. Stem Break Torque at Maximum Operating Pressure (in.-lb.)

Based on TFM and TFMC Seat Testing

Ser.	Size (in.)										
	1/2	3/4	1	1 1/2	2	3	4	6	8	10	12
Class 150											
4400	—	—	—	—	660	1210	1660	2270	5150	12,000	—
4500	—	—	—	280	570	1060	1530	1930	—	—	—
5400	—	170	230	280	660	1210	1660	2270	5150	12,000	29,250
6400	170	230	280	660	1210	1660	2270	5150	12,000	29,250	—
6500	—	—	280	570	1060	1530	1930	4600	—	—	—
Class 300											
4400	—	—	—	—	730	1230	2400	3190	6990	13,000	—
4500	—	—	—	320	640	1080	2270	2850	—	—	—
5400	—	200	260	320	730	1230	2400	3190	6990	13,000	30,000
6400	200	260	320	730	1230	2400	3190	6990	13,000	30,000	—
6500	—	—	320	640	1080	2270	2860	6440	—	—	—
Class 600											
4400	—	260	320	380	850	1250	2400	4090	—	—	—
4500	—	—	—	380	760	1100	2160	3900	—	—	—
6400	260	320	380	850	1250	2400	4100	—	—	—	—
6500	—	—	380	760	1100	2160	3900	—	—	—	—



Torque Chart (Above) is for TFM or TFMC Seats. See Note 1 for other seat materials or contact your PBV® sales representative.

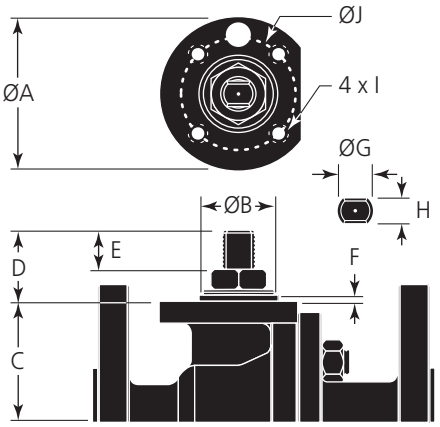
Notes:

1) Torque values are for new valves with TFM/TFMC and clean water service. • For Nylon seats, add an additional 25% minimum. For PEEK™ seats, multiply values x 2.2.
2) No additional safety factors have been added.
3) Stem torque service condition factors: For powered actuators, it's recommended to add an additional 25% min. • For dirty service, add an additional 50% minimum. • For dry gas service, add 25% minimum.
4) To prevent stem side loading and eliminate potential stem galling, the following tolerances for mounting actuators are recommended: Actuator mounting bracket flanges must be parallel within .015". • The maximum allowed run out on the stem coupling bores are .008" • 8", 10" & 12", Class 300, have a maximum operating pressure of 550 psig.

Actuator Mounting Data • Series 4400/5400/6400 • 1/2"-12" Class 150, 300 & 600

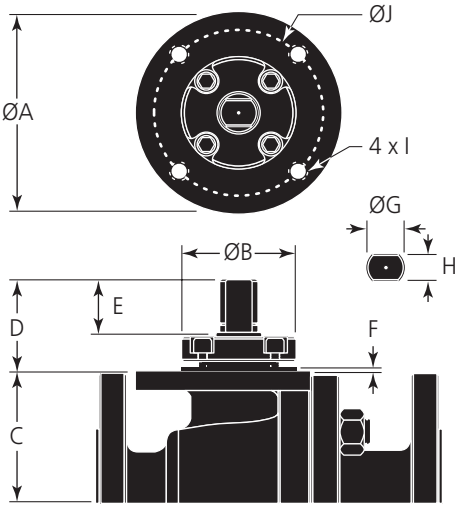
Vlv Size (in.)	A	B	C	D	E	F	G +000/-003	H +000/-003	I UNC	J	ISO 5211
Series 6400, Class 150/300, 1/2"- 1"											
1/2	1.97	0.984	1.54	1.04	0.33	0.08	0.437	0.314	1/4-20	1.42	F03
3/4	1.97	0.984	1.64	1.04	0.33	0.08	0.437	0.314	1/4-20	1.42	F03
1	2.56	1.378	1.98	1.18	0.34	0.08	0.500	0.394	1/4-20	2.00	F05
Series 6400, Class 600, 1/2"- 1"											
1/2	1.97	0.984	1.54	1.04	0.33	0.08	0.437	0.314	1/4-20	1.42	F03
3/4	1.97	0.984	1.65	1.04	0.33	0.08	0.437	0.314	1/4-20	1.42	F03
1	2.56	1.378	1.98	1.18	0.34	0.08	0.500	0.394	1/4-20	2.00	F05
Series 5400, Class 150/300, 3/4"- 1 1/2"											
3/4	1.97	0.984	1.02	0.78	0.27	0.06	0.313	0.197	1/4-20	1.42	F03
1	2.20	0.984	1.26	0.90	0.31	0.08	0.375	0.236	1/4-20	1.65	F04
1 1/2	2.56	1.378	2.12	1.19	0.34	0.08	0.500	0.394	1/4-20	2.00	F05
Series 4400, Class 600, 3/4"- 1 1/2"											
3/4	1.97	0.984	1.54	1.04	0.33	0.08	0.437	0.314	1/4-20	1.42	F03
1	1.97	0.984	1.65	1.04	0.33	0.08	0.437	0.314	1/4-20	1.42	F03
1 1/2	2.56	1.378	1.98	1.19	0.34	0.08	0.500	0.394	1/4-20	2.00	F05

Class 150, 300 & 600 • 1/2"-1 1/2"



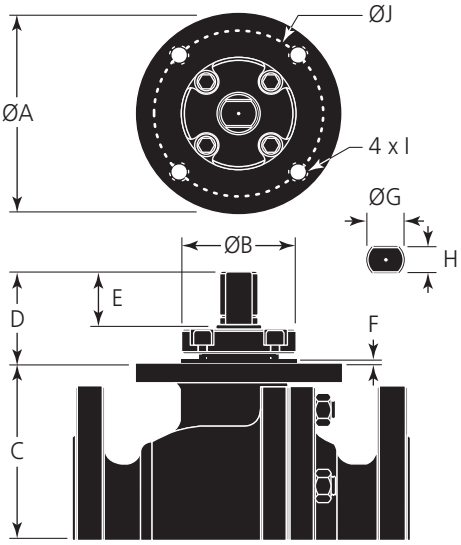
Vlv Size (in.)	A	B	C	D	E	F	G +000/-003	H +000/-003	I UNC	J	ISO 5211
Series 6400, Class 150/300, 1 1/2"- 2"											
1 1/2	3.54	1.771	2.59	1.79	0.71	0.08	0.767	0.551	5/16 -18	2.75	F07
2	3.54	1.771	3.48	2.19	1.07	0.08	0.906	0.669	5/16 -18	2.75	F07
Series 6400, Class 600, 1 1/2"- 2"											
1 1/2	3.54	1.771	2.59	1.79	0.71	0.08	0.767	0.551	5/16 -18	2.75	F07
2	3.54	1.771	3.48	2.19	1.07	0.08	0.906	0.669	5/16 -18	2.75	F07
Series 5400, Class 150/300, 2"- 4"											
2	3.54	1.771	2.55	1.79	0.71	0.08	0.767	0.551	5/16 -18	2.75	F07
3	3.54	1.771	3.69	2.15	1.06	0.08	0.906	0.669	5/16 -18	2.75	F07
4	3.54	1.771	4.26	2.15	1.06	0.08	0.906	0.669	5/16 -18	2.75	F07
Series 4400, Class 150/300, 2"- 3"											
2	3.54	1.771	2.59	1.79	0.71	0.08	0.767	0.551	5/16 -18	2.75	F07
3	3.54	1.771	3.48	2.19	1.06	0.08	0.906	0.669	5/16 -18	2.75	F07
Series 4400, Class 600, 2"- 3"											
2	3.54	1.771	2.59	1.79	0.71	0.08	0.767	0.551	5/16 -18	2.75	F07
3	3.54	1.771	3.48	2.19	1.06	0.08	0.906	0.669	5/16 -18	2.75	F07

Class 150, 300 & 600 • 1 1/2"-4"



Vlv Size (in.)	A	B	C	D	E	F	G +000/-003	H +000/-003	I UNC	J	ISO 5211
Series 6400, Class 150/300, 3"- 10"											
3	4.92	2.755	4.30	2.21	1.03	0.08	0.906	0.669	3/8 -16	4.00	F10
4	5.90	3.346	5.31	2.52	1.10	0.08	1.279	0.905	1/2 -13	4.95	F12
6	6.88	3.937	7.05	3.32	1.72	0.08	1.633	1.062	5/8 -11	5.50	F14
8	8.26	4.724	9.09	3.88	2.00	0.08	1.870	1.259	3/4 -10	6.50	F16
10	8.26	4.724	11.02	4.08	2.21	0.08	2.283	1.496	3/4 -10	6.50	F16
Series 6400, Class 600, 3"- 4"											
3	5.90	3.346	4.65	2.54	1.11	0.08	1.279	0.906	1/2 -13	4.95	F12
4	5.90	3.937	5.83	3.43	1.73	0.08	1.633	1.062	1/2 -13	4.95	F12
Series 5400, Class 150/300, 6"- 12"											
6	5.90	3.346	5.83	2.52	1.10	0.08	1.279	0.905	1/2 -13	4.95	F12
8	6.88	3.937	7.02	3.30	1.72	0.08	1.633	1.062	5/8 -11	5.50	F14
10	8.26	4.724	8.51	3.88	2.00	0.08	1.870	1.259	3/4 -10	6.50	F16
12	8.26	4.724	10.24	4.06	2.19	0.08	2.283	1.496	3/4 -10	6.50	F16
Series 4400, Class 150/300, 4"- 10"											
4	4.92	2.755	4.30	2.21	1.03	0.08	0.906	0.669	3/8 -16	4.00	F10
6	5.90	3.346	5.31	2.52	1.10	0.08	1.279	0.905	1/2 -13	4.95	F12
8	6.89	3.937	7.05	3.32	1.72	0.08	1.633	1.062	5/8 -11	5.50	F14
10	8.26	4.724	9.09	3.88	2.00	0.08	1.870	1.259	3/4 -10	6.50	F16
Series 4400, Class 600, 4"- 6"											
4	5.90	3.346	4.65	2.54	1.11	0.08	1.279	0.906	1/2 -13	4.95	F12
6	5.90	3.937	5.83	3.43	1.73	0.08	1.633	1.062	1/2 -13	4.95	F12

Class 150, 300 & 600 • 3"-12"



Firesafe ISO Design

PBV®'s Series 4400/6400/5400/4500/6500 valves have all been proven to be Firesafe to API 607 or API 6FA. As illustrated, full metal-to-metal contact is attained at all sealing areas after the primary soft seals have been destroyed during a fire.

Stem Packing Seal

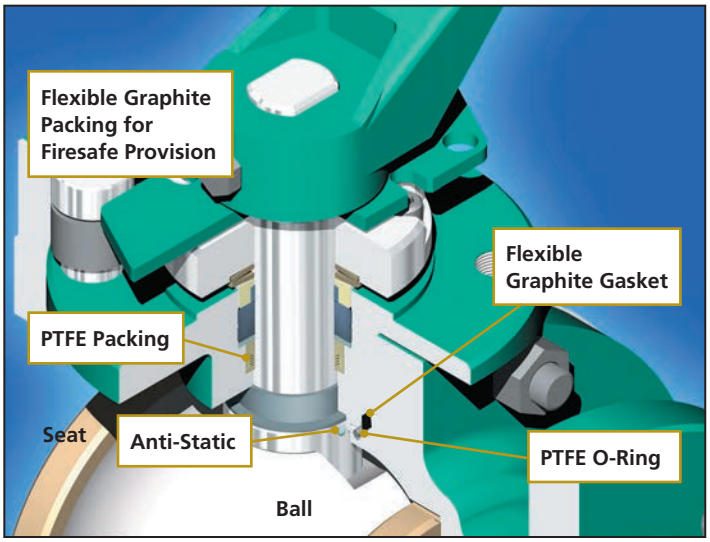


Figure 1. Before Fire

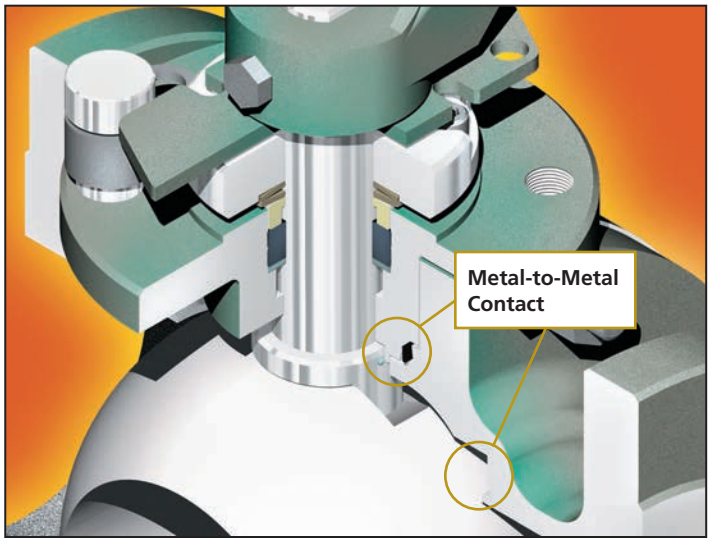


Figure 2. After Fire

Live Load & Double Packing Stem Seal Features

Belleville spring washers are used to achieve live loading and minimize the need to retighten packing.

Primary PTFE Chevron stem seal and secondary firesafe flexible graphite stem steal are standard for all PBV® ball valves which provide low break torque, excellent emission control and good chemical and thermal resistance.

Anti-Static Device

Internal parts that are insulated from the valve body by non-conductive seat and seal materials may build up a static electric charge. To ensure electrical continuity between the stem and the ball and body, PBV® includes anti-static devices as an integral part of all floating ball valves.

O-Ring Stem Seal

A fitting is provided on the valve for injection of corrosion inhibiting grease into the stem seal cavity, which prevents water intrusion and subsequent corrosion.

Packing adjustments are not required with the o-ring stem seal. The o-ring stem seal provides low break torque and excellent emission control. Viton® GF seals are standard and will provide broad chemical resistance from -15˚F to 400˚F.

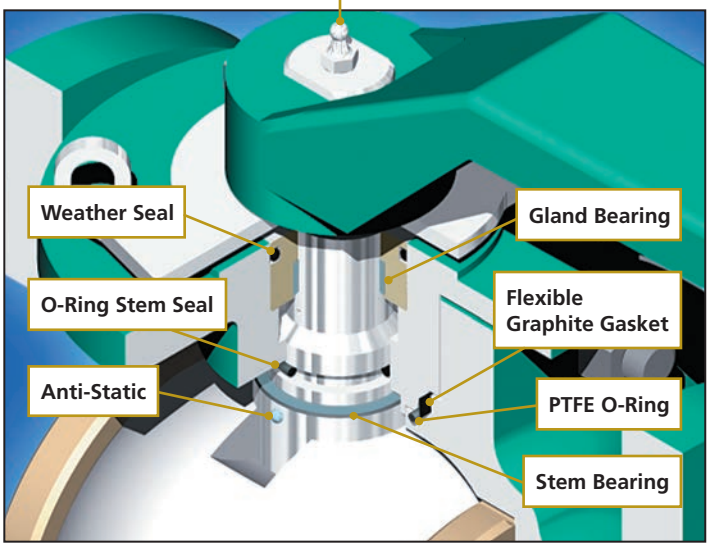


Figure 3. Before Fire

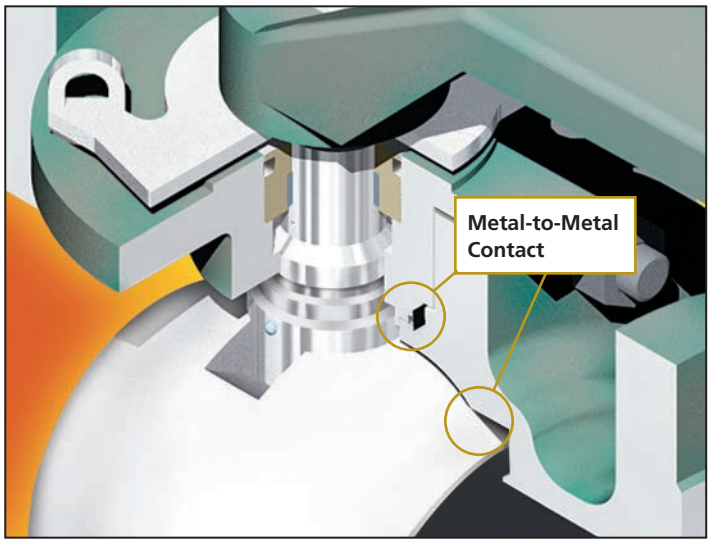
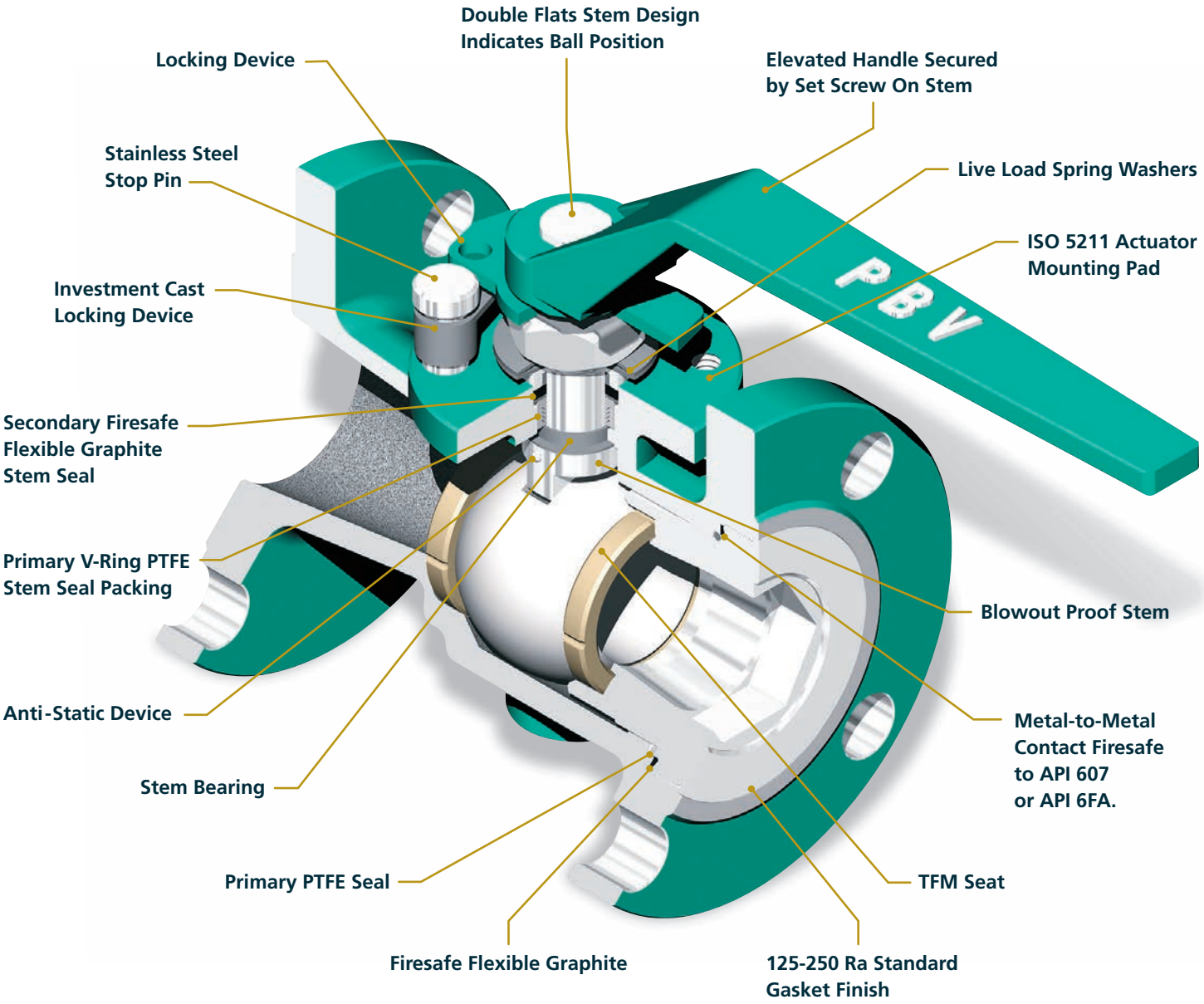


Figure 4. After Fire

Standard Features

Series 5400 Regular Port, Unibody, Stem Packing Ball Valve

This is an illustrated cross section of a typical PBV® regular port, unibody, floating ball valve exhibiting standard design features. The actual design of a particular valve may be slightly different from this illustration depending on its size and pressure class.



PBV® Flanged Floating Ball Valves are designed for Oil & Gas Production and other applications.

Dimensional Data

Series 5400 Regular Port • 3/4"-12" Class 150 & 300

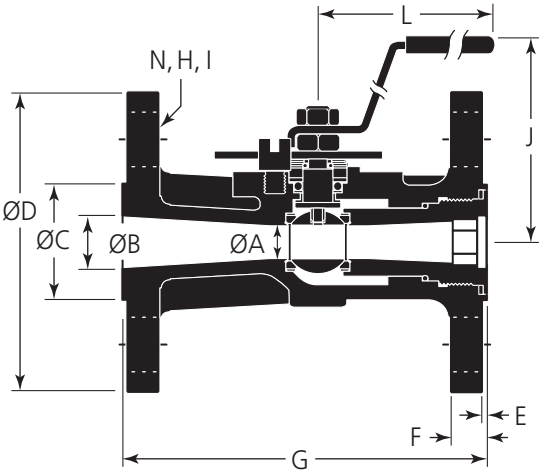
Test Pressure

Class	Shell (Hydrostatic)	Seat (Air)
Class 150	450 psi	80 psi
Class 300	1125 psi	80 psi

N • No. Holes
H • Bolt Hole Dia.
I • Bolt Center Dia.

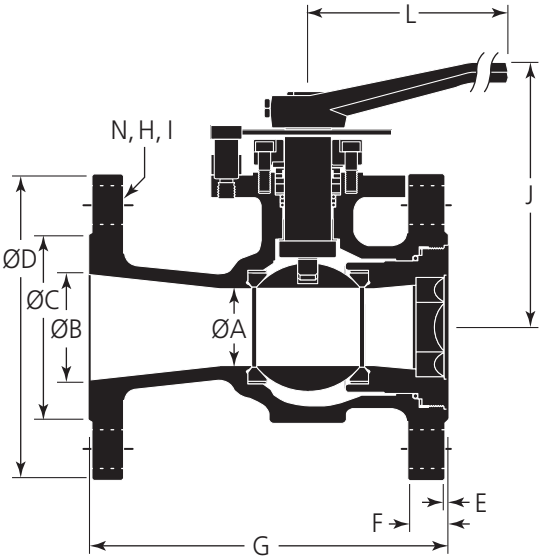
Class 150 & 300 3/4"-1 1/2" (in.)

Valve Sz. (in.)	A	B	C	D	E	F	G	NxØH	I	J	L
	Class 150, 3/4"-1 1/2"										
3/4	0.49	0.79	1.69	3.88	0.06	0.44	4.62	4xØ.62	2.75	4.25	5.50
1	0.71	0.98	2.00	4.25	0.06	0.44	5.00	4xØ.62	3.12	4.68	6.30
1 1/2	1.18	1.50	2.88	5.00	0.06	0.57	6.50	4xØ.62	3.88	5.80	6.30
	Class 300, 3/4"-1 1/2"										
3/4	0.49	0.79	1.69	4.62	0.06	0.62	6.00	4xØ.75	3.25	4.25	5.50
1	0.71	0.98	2.00	4.88	0.06	0.69	6.50	4xØ.75	3.50	4.68	6.30
1 1/2	1.18	1.50	2.88	6.12	0.06	0.81	7.50	4xØ.88	4.50	5.80	6.30



Class 150 & 300 2"-4" (in.)

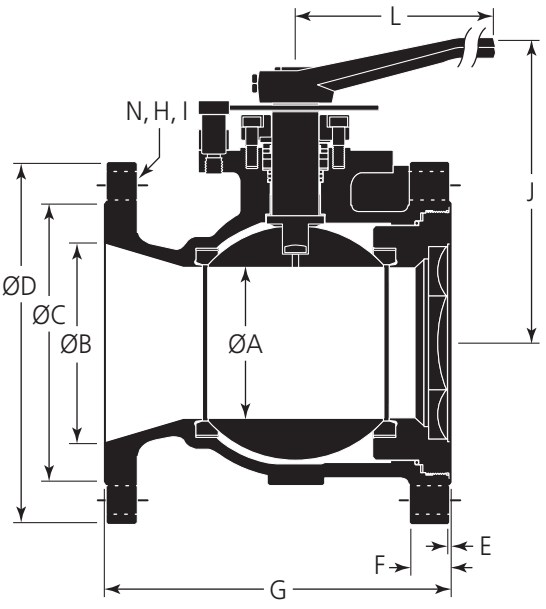
Valve Sz. (in.)	A	B	C	D	E	F	G	NxØH	I	J	L
	Class 150, 2"-4"										
2	1.50	2.00	3.62	6.00	0.06	0.68	7.00	4xØ.75	4.75	5.74	9.00
3	2.28	3.00	5.00	7.50	0.06	0.81	8.00	4xØ.75	6.00	7.13	16.50
4	3.00	4.00	6.19	9.00	0.06	1.00	9.00	8xØ.75	7.50	7.69	16.50
	Class 300, 2"-4"										
2	1.50	2.00	3.62	6.50	0.06	0.88	8.50	8xØ.75	5.00	5.74	9.00
3	2.28	3.00	5.00	8.25	0.06	1.12	11.12	8xØ.88	6.62	7.13	16.50
4	2.28	4.00	6.19	10.00	0.06	1.25	12.00	8xØ.88	7.88	7.69	16.50



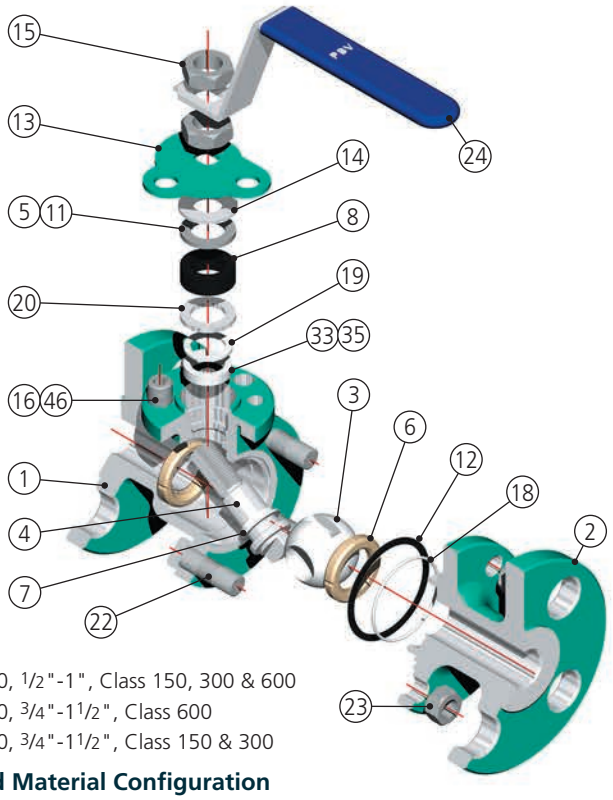
Class 150 & 300 6"-12" (in.)

Valve Sz. (in.)	A	B	C	D	E	F	G	NxØH	I	J	L
	Class 150, 6"-12"										
6	4.49	6.00	8.50	11.00	0.06	1.00	10.50	8xØ.88	9.50	9.22	19.70
8	6.00	8.00	10.62	13.50	0.06	1.12	11.50	8xØ.88	11.75	—	—
10	7.32	10.00	12.75	16.00	0.06	1.19	13.00	12xØ1.00	14.25	—	—
12	8.94	12.00	15.00	19.00	0.06	1.25	14.00	12xØ1.00	17.00	—	—
	Class 300, 6"-12"										
6	4.49	6.00	8.50	12.50	0.06	1.44	15.88	12xØ.88	10.62	10.30	43.00
8	6.00	8.00	10.62	15.00	0.06	1.62	16.50	12xØ1.00	13.00	—	—
10	7.32	10.00	12.75	17.50	0.06	1.88	18.00	16xØ1.12	15.25	—	—
12	8.94	12.00	15.00	20.50	0.06	2.00	19.75	16xØ1.25	17.75	—	—

Note: 8"-12" gear operated



Parts & Materials for Stem Packing Design Valves

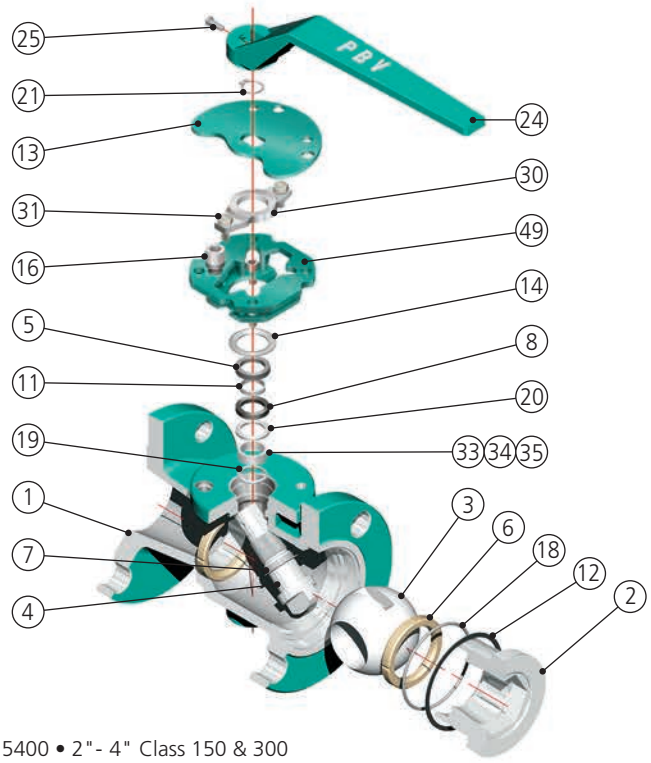


Series 6400, 1/2"-1", Class 150, 300 & 600
Series 4400, 3/4"-1 1/2", Class 600
Series 5400, 3/4"-1 1/2", Class 150 & 300

Standard Material Configuration

Item No.	Description	Material		
1	Body	WCB	LCC	CF8M
2	Cap/Insert*	WCB	LCC	CF8M
3	Ball	ASTM A351 CF8M		
4	Stem	17-4 PH		
5	Gland	Stainless Steel		
6	Ball Seat	TFM/TFMC		
7	Stem Bearing	G/F PTFE		
8	Secondary Packing	Flexible Graphite		
11	Gland Bearing	PTFE		
12	Body Gasket	Graphite		
13	Stop Plate/Lock Device	Stainless Steel		
14	Spring Washer	Stainless Steel		
15	Jam Nut	Stainless Steel		
16	Stop	17-4 PH		
18	Body O-Ring	Virgin PTFE		
19	Primary Packing Washer	Stainless Steel		
20	Secondary Packing Washer	Stainless Steel		
22	Stud	B7M	L7M	B8
23	Nut	2HM	7M	8
24	Handle	Stainless Steel		
26	ID Tag (not shown)	Stainless Steel		
33	Primary Packing (Top)	Virgin PTFE		
35	Primary Packing (Bottom)	Virgin PTFE		
46	Lock Washer	Stainless Steel		

Note: *Series 5400 not shown.



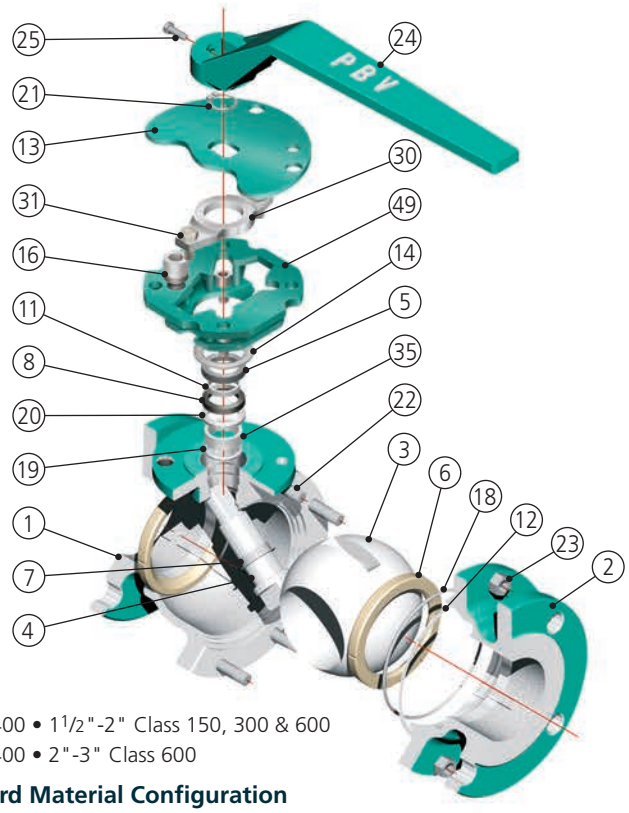
Series 5400 • 2"- 4" Class 150 & 300

Standard Material Configuration

Item No.	Description	Material		
1	Body	WCB	LCC	CF8M
2	Insert	WCB	LCC	CF8M
3	Ball	ASTM A351 CF8M		
4	Stem	ASTM A276 316		
5	Gland	Stainless Steel		
6	Ball Seat*	TFM		
7	Stem Bearing*	G/F PTFE		
8	Secondary Packing*	Flexible Graphite		
11	Gland Bearing*	G/F PTFE		
12	Body Gasket*	Graphite		
13	Stop Plate/Lock Device	Stainless Steel		
14	Spring Washer	Stainless Steel		
16	Stop	17-4 PH		
18	Body O-Ring*	Virgin PTFE		
19	Primary Packing Washer	Stainless Steel		
20	Secondary Packing Washer	Stainless Steel		
21	Snap Ring	Stainless Steel		
24	Handle	Ductile Iron		
25	Handle Screw	Carbon Steel		
26	ID Tag (not shown)	Stainless Steel		
30	Gland Plate	Stainless Steel		
31	Gland Bolt	ASTM A193 B8		
33	Primary Packing (Top)*	Virgin PTFE		
34	Primary Packing (Middle)*	Virgin PTFE		
35	Primary Packing (Bottom)*	Virgin PTFE		
49	Stop Bracket	Stainless Steel		

Note: *Recommended spare parts

Parts & Materials for Stem Packing Design Valves

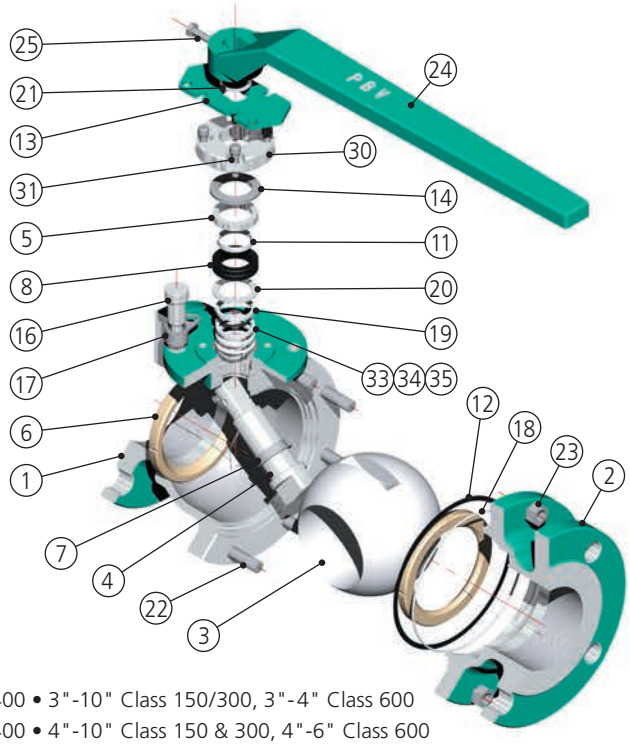


Series 6400 • 1 1/2"-2" Class 150, 300 & 600
Series 4400 • 2"-3" Class 600

Standard Material Configuration

Item No.	Description	Material		
1	Body	WCB	LCC	CF8M
2	Cap	WCB	LCC	CF8M
3	Ball	ASTM A351 CF8M		
4	Stem	ASTM A276 316		
5	Gland	Stainless Steel		
6	Ball Seat*	TFM/TFMC		
7	Stem Bearing*	G/F PTFE		
8	Secondary Packing*	Flexible Graphite		
11	Gland Bearing*	G/F PTFE		
12	Body Gasket*	Graphite		
13	Stop Plate/Lock Device	Stainless Steel		
14	Spring Washer	Stainless Steel		
16	Stop	AISI 304 17-4 PH		
18	Body O-Ring*	Virgin PTFE		
19	Primary Packing Washer	Stainless Steel		
20	Secondary Packing Washer	Stainless Steel		
21	Snap Ring	Stainless Steel		
22	Stud	B7M	L7M	B8
23	Nut	2HM	7M	8
24	Handle	Ductile Iron		
25	Handle Screw	Carbon Steel		
26	ID Tag (not shown)	Stainless Steel		
30	Gland Plate	Stainless Steel		
31	Gland Bolt	ASTM A193 B8		
33	Primary Packing (Top)*	Virgin PTFE		
34	Primary Packing (Middle)*	Virgin PTFE		
35	Primary Packing (Bottom)*	Virgin PTFE		
49	Stop Bracket	Stainless Steel		

*Recommended spare parts. **Note:** 1) Gear is optional.



Series 6400 • 3"-10" Class 150/300, 3"-4" Class 600
Series 4400 • 4"-10" Class 150 & 300, 4"-6" Class 600
Series 5400 • 6"-12" Class 150 & 300

Standard Material Configuration

Item No.	Description	Material		
1	Body (Note 3)	WCB	LCC	CF8M
2	Cap/Insert (Note 3)	WCB	LCC	CF8M
3	Ball	ASTM A351 CF8M		
4	Stem	ASTM A276 316		
5	Gland	Stainless Steel		
6	Ball Seat	TFM/TFMC		
7	Stem Bearing	G/F PTFE		
8	Secondary Packing	Flexible Graphite		
11	Gland Bearing	G/F PTFE		
12	Body Gasket	Graphite		
13	Stop Plate/Lock Device	Stainless Steel		
14	Spring Washer	Stainless Steel		
16	Stop	17-4 PH		
17	Lock Plate	Stainless Steel		
18	Body O-Ring	Virgin PTFE		
19	Primary Packing Washer	Stainless Steel		
20	Secondary Packing Washer	Stainless Steel		
21	Snap Ring	Stainless Steel		
22	Stud	B7M	L7M	B8
23	Nut	2HM	7M	8
24	Handle	Ductile Iron		
25	Handle Screw	Carbon Steel		
26	ID Tag (not shown)	Stainless Steel		
30	Gland Plate	Stainless Steel		
31	Socket Head Screw	Stainless Steel		
33	Primary Packing (Top)	Virgin PTFE		
34	Primary Packing (Middle)	Virgin PTFE		
35	Primary Packing (Bottom)	Virgin PTFE		

Note: 1) 8"-12" gear operated
2) Ser. 5400 body & insert design same as 2"- 4" illustration on pg. 20.