

How To Order

Specifying PBV® Series 5700/6700 Valve Figure Numbers

Example: 6" C-6710-71-2200-GH-NG This number represents a 6" ANSI Class 150, Full Port, Three-Piece Trunnion Ball Valve, Fire Tested with Emergency Grease Seals, with Raised Face, Carbon Steel Body Material, Carbon Steel Trim, Glass Filled TFE Seats, HNBR Seals, for NACE MR0175/ISO 15156 Service and Gear Operated.

C - 6 7 10 - 7 1 - 22 00 - G H - N G -

Material Code	Port Config.	Valve Type	Pressure Class	Fire Tested	End Conn.	Body Material	Trim Material	Seat Material	Seal Material	NACE Option	Operator	Modifier Code
C Carbon Steel	5 Std.	7 3 Pc. Trunnion Type Bolted Body	10 150 CL	3 Fire Tested	1 RF	22* A105/A350 LF2	00 Same as Body	G Glass Filled PTFE	B Buna-N	N NACE	A Actuator	EXX Stem Extens. inches
S Stainless Steel	6 Full	9 3 Pc. Trunnion Type Welded Body	30 300 CL	7 Fire Tested w/ Emerg. Grease Seals	2 Non-Std.	25* A105/A350 LF2	36⁽³⁾ Stainless Steel	D Devlon®	E EPDM	S Non NACE	B Bare Stem	XXX Modifier Code
			60 600 CL		3 RTJ	34 304SS	55 F55 Duplex	N Nylon	H(2) HNBR		G Gear Operator	HXXX Buried Valve Extens. inches
			90 900 CL		4 RF x WE	36 316SS	71 Monel®	P PEEK™	R Low Temp		L Lever	SXXX 2" Nut Extens. inches
			15 1500 CL		5 WE x WE	55 F55 Duplex		V Viton® A	T(1)(2) Lip Seal PTFE			
			25 2500 CL		6 RTJ x WE	81 ENP		Z Tungsten Carbide Coating or Special	V Viton® A			
						82 CRA Weld Overlay			W(2) Viton® B			

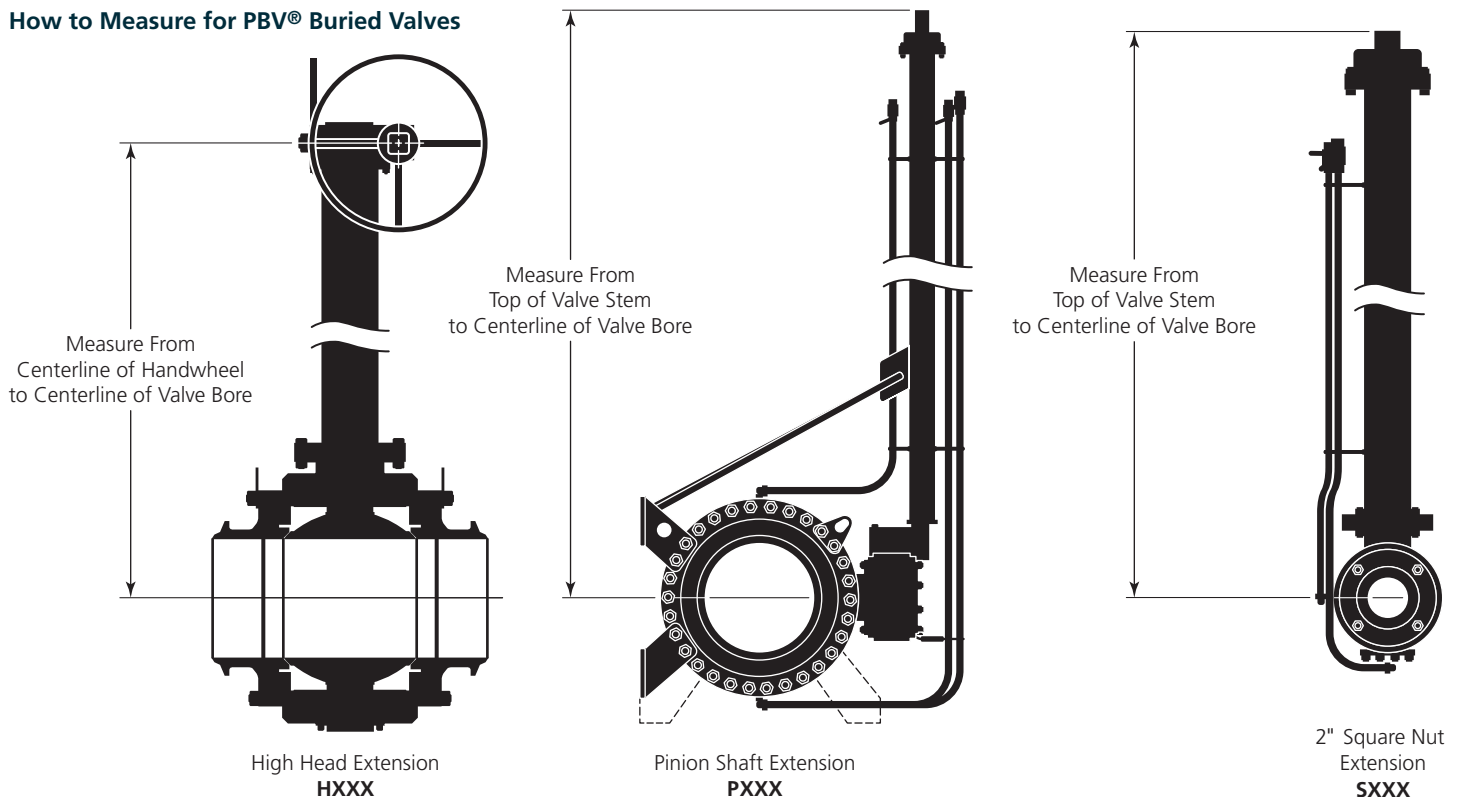
Notes: 1) For Low Temperature Service & Severe Service.

2) For Explosive Decompression Service. Other body, trim, seat and seal materials are available upon request.

3) For "36" trim, large diameter and Class 900 and higher, 17-4PH material is standard for ball and stem. All valves 6" and larger have 17-4PH stems when "36" trim is specified. Stronger material may be used to satisfy design requirements. Stems can be 316SS, S20910, 17-4PH, etc.

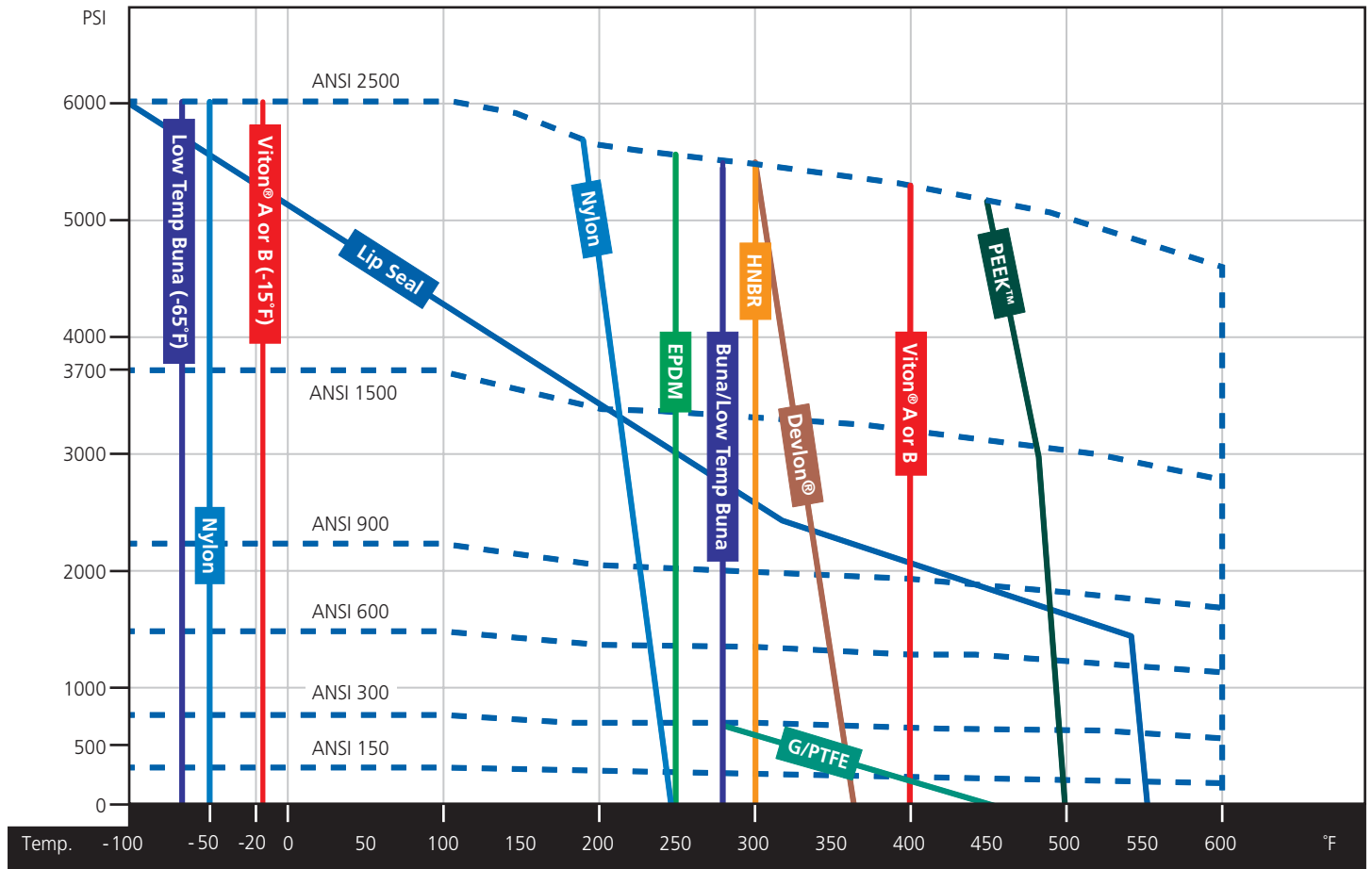
* Dual rated A105/A350 LF2

How to Measure for PBV® Buried Valves

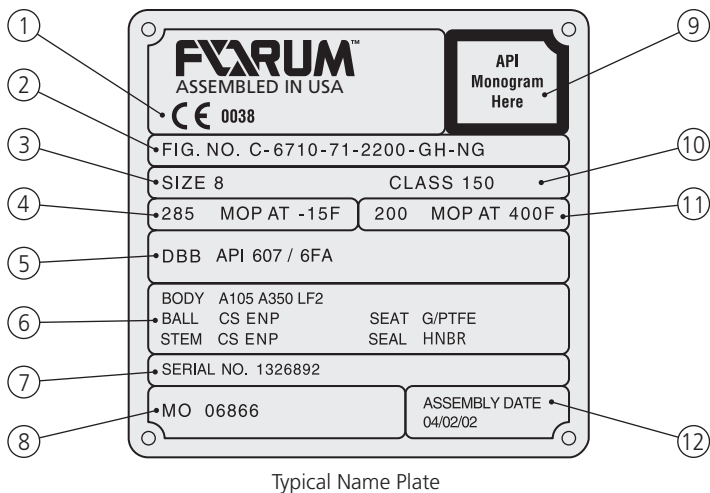


Pressure Temperature

The chart below depicts pressure and temperature ratings for common plastics and elastomers used in PBV® ball valves. Other materials are available upon request.



How to Read a Name Plate



PBV® Repair Kits

Spare parts are available for quick delivery. Orders with valve serial numbers will ensure the correct parts are shipped. Contact your PBV® salesperson for more information.

Item	Description
1	CE mark and notified body required for delivery to EEC.
2	Figure number describes valve construction.
3	Nominal pipe size in inches
4	Max. operating pressure at min. valve design temperature
5	Valve features double block and bleed (DBB) and firesafe standards.
6	Body and trim materials
7	PBV® serial number
8	PBV® manufacturing order
9	API 6D or 6A monogram stamp
10	ANSI Pressure Class
11	Max. operating pressure at max. valve design temperature
12	Date of assembly MM/DD/YY

Our Quality Commitment...

Forum™ Energy Technologies is dedicated to continually improving their state-of-the-art engineering and manufacturing capabilities to improve the overall quality of their products and customer service. FET's entire global network of flow control experts consist of highly trained technicians, engineers, and superior testing laboratories to ensure that all products supplied to our customers are 100% in accordance with industry standards as well as our own Quality Management System.

Ball Valve Stem Torques

Series 5700/6700 • 2"FP- 36"FP, Class 150 thru 2500

To calculate torque at any pressure use the formula located under Class for each valve size.

Example: An 8" Class 600 at 1100 psi = 4060 + (5.64 x 1100) = 10,264 in.-lbs.

G/PTFE Seats, Class 150-300, 2" - 14"

Port Size (in.)	Class 150 - 300 Stem Torque Formula, (in.-lbs.)	Class 150 Stem Torque (in.- lbs.)	Class 300 Stem Torque (in.- lbs.)
	MOP (psi)	285	740
2	$617 + 0.55*\Delta P$	770	1020
3	$1034 + 0.87*\Delta P$	1280	1680
4	$1450 + 1.56*\Delta P$	1890	2600
6	$3352 + 2.80*\Delta P$	4150	5420
8	$4060 + 5.64*\Delta P$	5670	8230
10	$5837 + 8.29*\Delta P$	8200	11,970
12	$12019 + 10.75*\Delta P$	15,080	19,970
14	$16327 + 12.36*\Delta P$	19,850	25,470

G/PTFE Seats, Class 150-300, 16" - 36"

Port Size (in.)	Class 150 - 300 Stem Torque Formula, (in.-lbs.)	Class 150 Stem Torque (in.- lbs.)	Class 300 Stem Torque (in.- lbs.)
	MOP (psi)	285	740
16	$20415 + 18.21*\Delta P$	25,600	33,890
18	$18152 + 32.57*\Delta P$	27,430	42,250
20	$31395 + 40.50*\Delta P$	43,790	63,580
24	$31060 + 56.26*\Delta P$	47,090	72,690
30	$74000 + 83*\Delta P$	97,770	170,940 ⁽¹⁾
34	$102760 + 127*\Delta P$	138,960	222,640 ⁽¹⁾
36	$119040 + 109*\Delta P$	150,100	233,700 ⁽¹⁾

⁽¹⁾ For torque calculation for pressures between 285 psi and 740 psi contact PBV® sales/engineering.

Nylon/Devlon® Seats, Class 600-2500, 2" - 36"

Port Size (in.)	Class 600 Stem Torque Formula, (in.-lbs.)	Cl. 600 Stem Torque (in.- lbs.)	Class 900 Stem Torque Formula	Cl. 900 Stem Torque (in.- lbs.)	Class 1500 Stem Torque Formula, (in.- lbs.)	Cl. 1500 Stem Torque (in.- lbs.)	Class 2500 Stem Torque Formula, (in.- lbs.)	Cl. 2500 Stem Torque (in.- lbs.)
	MOP (psi)	1480	MOP (psi)	2220	MOP (psi)	3705	MOP (psi)	6170
2	$617 + 0.55*\Delta P$	1430	$617 + 0.55*\Delta P$	1840	$617 + 0.55*\Delta P$	2660	$966 + 0.31*\Delta P$	2890
3	$1034 + 0.87*\Delta P$	2320	$1034 + 0.87*\Delta P$	2970	$1034 + 0.87*\Delta P$	4260	$1204 + 0.55*\Delta P$	4570
4	$1450 + 1.56*\Delta P$	3750	$1450 + 1.56*\Delta P$	4900	$1628 + 1.41*\Delta P$	6850	$1800 + 0.88*\Delta P$	7240
6	$3352 + 2.80*\Delta P$	7490	$3352 + 2.80*\Delta P$	9560	$3042 + 3.05*\Delta P$	14,320	$4077 + 2.73*\Delta P$	20,910
8	$4060 + 5.64*\Delta P$	12,400	$4060 + 5.64*\Delta P$	16,570	$7733 + 5.70*\Delta P$	28,830	$6425 + 5.48*\Delta P$	40,250
10	$5837 + 8.29*\Delta P$	18,100	$4809 + 9.45*\Delta P$	25,790	$7621 + 10.75*\Delta P$	47,450	$10007 + 10.21*\Delta P$	72,980
12	$12019 + 10.75*\Delta P$	27,930	$12079 + 12.54*\Delta P$	39,910	$10491 + 14.32*\Delta P$	63,550	$17049 + 14.36*\Delta P$	105,630
14	$16327 + 12.36*\Delta P$	34,620	$15028 + 22.39*\Delta P$	64,730	$18462 + 19.41*\Delta P$	90,380	—	—
16	$20415 + 18.21*\Delta P$	47,360	$18820 + 30.88*\Delta P$	116,500	$18385 + 30.74*\Delta P$	177,000	—	—
18	$18152 + 32.57*\Delta P$	66,350	$18024 + 60.89*\Delta P$	152,000	$14790 + 60.25*\Delta P$	238,000	—	—
20	$31395 + 40.50*\Delta P$	95,770	$28546 + 83.99*\Delta P$	215,000	$64400 + 74.39*\Delta P$	340,000	—	—
24	$31060 + 56.26*\Delta P$	114,320	$49264 + 87.65*\Delta P$	243,850	$71144 + 202.62*\Delta P$	520,900	—	—
30	$159000 + (201*(P-700))$	315,780	—	—	—	—	—	—
34	$206700 + (258*(P-700))$	407,940	—	—	—	—	—	—
36	$216215 + (270*(P-700))$	426,280	—	—	—	—	—	—

Torque values are for new valves with clean water.

No additional safety factors have been added.

For powered actuators, it is recommended to add an additional 25% minimum.

For dirty service, add an additional 25% minimum.

For dry gas service, add 50% minimum.

To prevent stem side loading and eliminate potential stem galling, the following tolerances for mounting actuators are recommended.

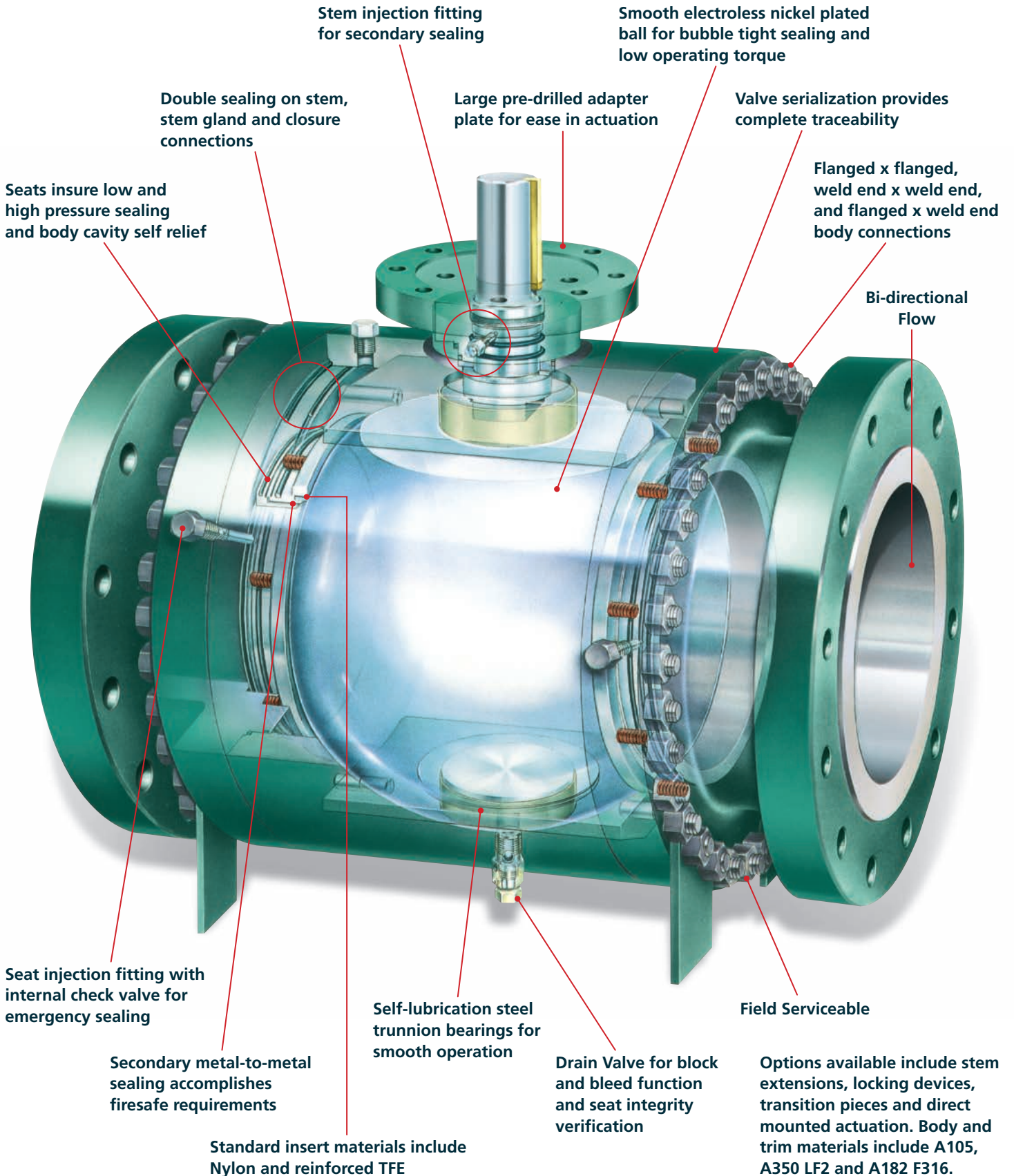
- Actuator mounting bracket flanges must be parallel within .015".
- The max allowed runout on the stem coupling bores are .008".

PBV® Engineering Excellence at Work

PBV® Series 5700/6700 Three-Piece, Side-Entry, Trunnion Ball Valve

2"- 56" ANSI Class 150/300, 600, 900, 1500 & 2500 • Full and Standard Port

PBV®'s trunnion ball valves are available in a variety of materials and configurations to meet your specific project requirements. Typical construction is shown here.



Features

Materials of Construction

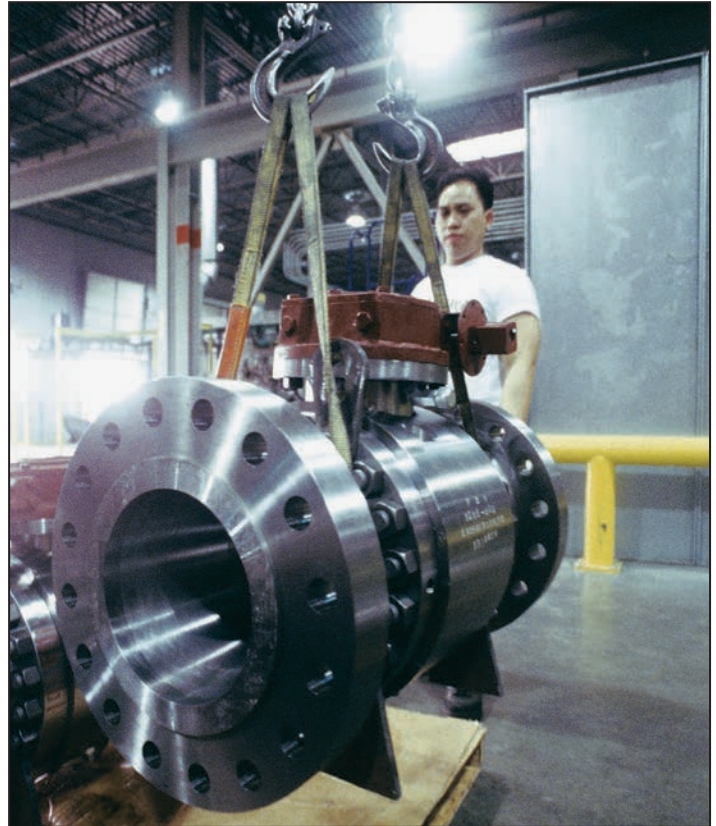
PBV® manufactures trunnion ball valves using a full range of carbon, alloy and stainless materials. Our commodity valves are manufactured using dual rated A105/A350 LF2 steel, B7M/ 2HM fasteners, and 3 mil ENP carbon steel trim on 6" and larger. Material test reports in accordance with EN10204 3.1b are available on each serialized valve.

NACE Compliance

The demand for valves to be resistant to sulfide stress cracking, and to perform in corrosive hydrocarbon environments, has become commonplace. Facilities handling H₂S bearing hydrocarbons have increased dramatically over recent years. Hydrogen sulfide concentration, total system pressure, application temperature, existence of elemental sulfur, and chloride content all have a bearing on appropriate material selection in this severe environment.

All materials used by PBV® are in accordance with the pre-qualified materials identified in NACE MR0175/ISO 15156. In order to ensure compliance customers must provide application specific operating conditions.

Inclusive to the above, valves with bore diameters 4" and smaller are supplied standard with Stainless Steel balls, seats and stems. Material type selected may vary depending on design requirements.



Emergency Sealant Injection

A secondary sealant injection system for stem seals is a standard feature on all PBV® Trunnion ball valves. On valves 6" bore and larger, the seat emergency sealant system shown here is a standard feature. A similar system is available for sizes 2" thru 4" on request. These systems are made available for the sole purpose of providing a temporary seal to an otherwise damaged area. PBV® ball valves require no lubrication under ordinary circumstances.

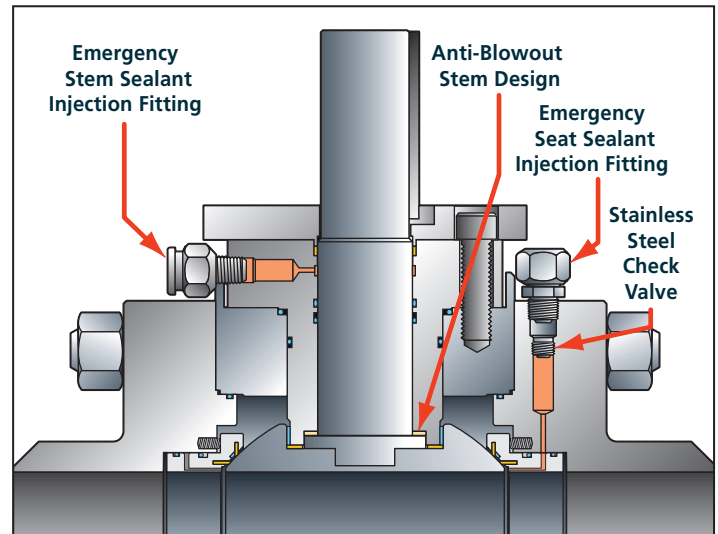
Anti-Blowout

Blowout proof stems are a standard feature of all PBV® ball valves.

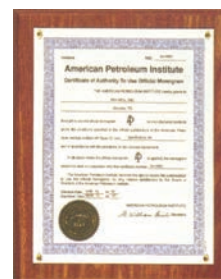
Certification of Quality and Design

Quality systems are a way of life at PBV®. In addition, PBV® functions under the requirements of an API Q1 quality program. Our facilities and quality programs are always open to customer audits. The complete PBV® trunnion ball valve line has been designed and tested to ensure that the external and through-bore maximum allowable leakage rates are maintained in the event of a fire. PBV® has equipment and facilities to firesafe test our products to the edition of API 607 and API 6FA firesafe standards.

All API 6D, API 6A, CE PED and other licenses are maintained on a current basis. Each and every PBV® trunnion ball valve is monogrammed and serialized under our API 6D-0129 or our API 6A-0383 license numbers.



API 6D



API 6A



ISO 9001:2008

Features

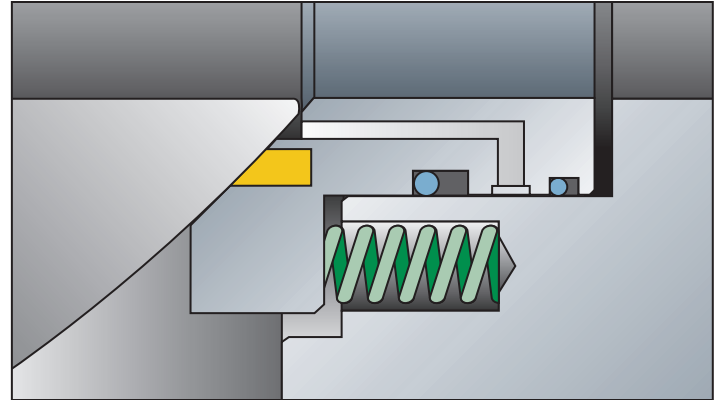
PBV®'s Patented Seat Technologies

PBV® provides the latest in valve seat technology. Other seat designs are also available to meet your application requirements. This makes PBV® one of the most flexible manufacturers in terms of available

seat configurations and designs. PBV®'s metal-to-metal seating technologies and manufacturing capabilities continue to lead the way in industry innovations where severe service applications are required.

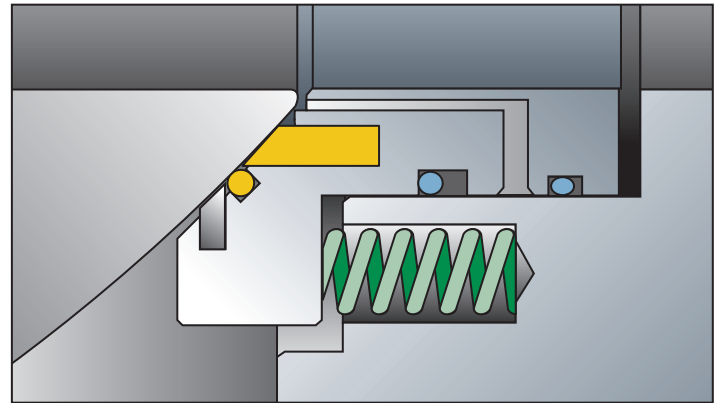
Compseal-0

The PBV® Compseal-0 design is ideal for applications where non-standard seat materials are required for the service conditions. The different materials give added flexibility for faster delivery in demanding applications. The seat inserts allow for a variety of materials to be used while still complying to API seat test requirements for "bubble-tight shut-off". Nylon Compseal-0 designs are standard on sizes 14" and larger.



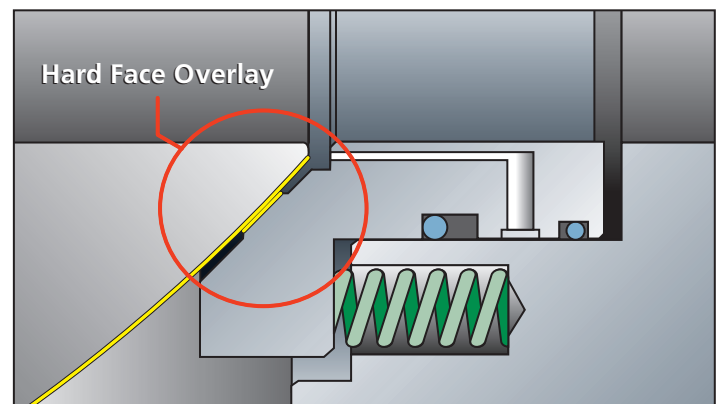
Compseal-1

PBV® Compseal-1 seat designs are for applications that require redundant sealing when access to a valve is limited or start up conditions are known to have debris in the line. Lower torque and low pressure shut-off are often achieved utilizing this design while providing customers with zero leakage reliability at an affordable price.



Metal-To-Metal Seats

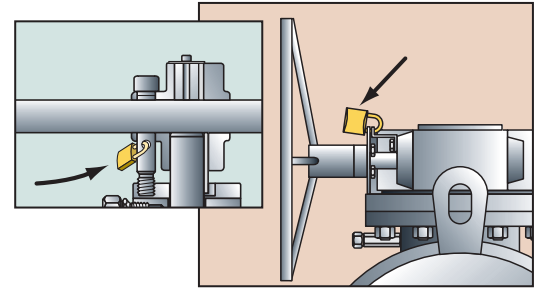
There are a number of services that require metal-to-metal seat technology. PBV® has extensive experience in the supply of valves for applications such as high temperature cokers, control valve applications and in corrosive and/or erosive environments. PBV® achieves the metal-to-metal seating technology through the use of various hard face material on the ball and seat face.



Features

Locking Devices

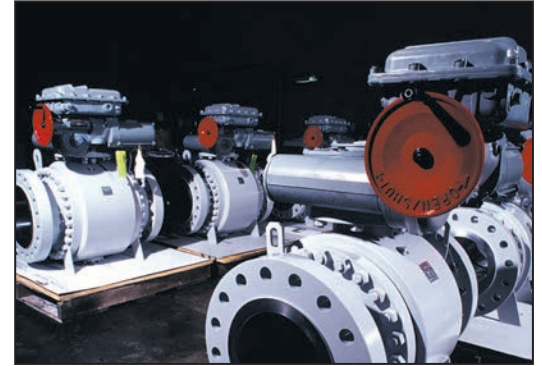
Locking devices are standard on all PBV® trunnion ball valves. The designs shown depict the locking feature for both lever-operated and gear-operated valves. In addition, a multiple lock template can accommodate safety requirements when more than one person needs reassurance of security. Special safety interlock devices are also available.



Actuation

PBV® ball valves are built to easily accept pneumatic, electric, hydraulic or gas-over-oil actuators. Break-away and run torque, which normally affect actuator sizing, are minimized to allow for economical actuator packages. Actuated ball valves may be supplied directly from PBV® under a single warranty.

Valve/Actuator assemblies can be tested to customer requirements at PBV® before shipment to the job site. The valves shown (right) are just a few of many severe service ball valves PBV® produced for the United States Department of Energy, Strategic Petroleum Reserves, complete with gear operators built and tested to DOE specifications.



Weld Overlay Technology

This technology is cost effective for ball valves in highly corrosive or erosive services. The life of a valve can be considerably extended at a fraction of the cost of a solid corrosion resistant alloy valve by the application of a weld overlay to valve internal surfaces.

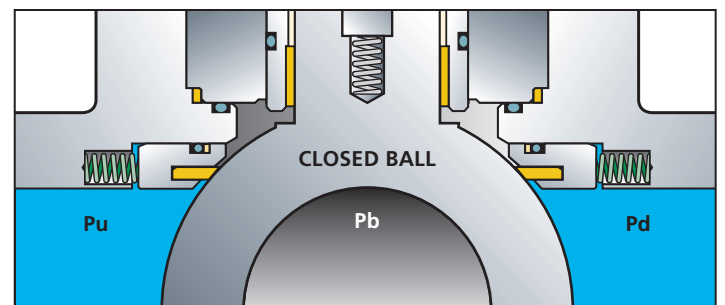
If you are currently using solid stainless steel or other high alloy valves the use of this technology could result in considerable savings with no sacrifice to service life or performance. Offered on valves 6" and larger.

Welding is performed in accordance with ASME BPV Section 9.



Double Block and Bleed Valves

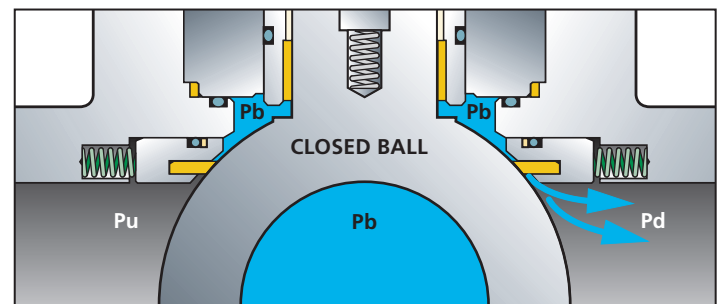
All PBV® trunnion mounted ball valves are designed and manufactured to facilitate block and bleed applications in the closed position only. In addition, valves 6" and larger can be completely flushed with the valve under pressure and in the closed position. This is achieved by utilizing the drain valve and vent hole in combination. The illustration shows both the upstream pressure (P_u) and the downstream pressure (P_d) being held independently from the body pressure (P_b). The piston effect principle illustrated assures bubble tight sealing simultaneously on both sides of the ball.



Shown In Closed Position.

Valve Cavity Pressure Relief

When a trunnion ball valve is in the closed position, media will be trapped in the body cavity. Unless this media is drained, it will be subjected to thermal expansion and contraction. As the temperature rises, the trapped media desires to expand and the pressure increases in the area shown as (P_b). In order to avoid excessive pressure build-up, the PBV® seats are designed to self-relieve, allowing the media in the body to escape to the pipeline. In this case, we have shown it to relieve to the downstream side (P_d). This self-relieving seat design feature is standard on all PBV® trunnion ball valves.



Shown In Closed Position.

Options

Buried Service

The photos and illustrations shown here typify the designs used for adapting a PBV® ball valve for buried service.

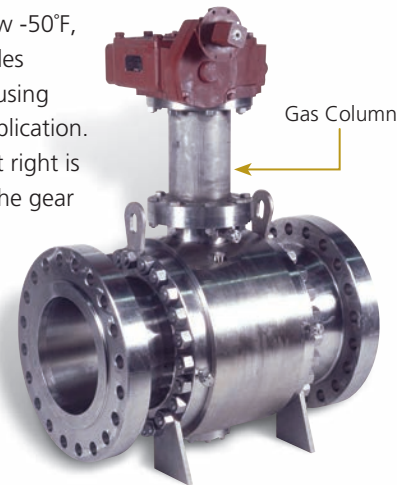
PBV® manufactures hi-head extensions exactly in accordance with customer specifications or according to our own engineering and manufacturing designs.

PBV® has the capabilities to produce giants like the one pictured at right. PBV® produced two 48" Class 600 ball valves with 96" extended stems for the Williams Energy, "Sundance Pipeline Project."



PBV® Ball Valves For Cryogenic Service

For service temperatures below -50°F, PBV®'s standard design includes lip seals and stem extensions using selected materials for your application. The 12" gas column shown at right is a standard feature to isolate the gear operator and stem seals from the cold media.



PBV® provides extended stems which are used in a variety of applications.



Subsea Valve



Splash Zone Valve

PBV® supplies subsea valves to individual customer requirements or to our own internal standards. Coatings, fastener protection, gear boxes with pressure equalizing devices, protected drive stems and customized ROV couplings are all components of design considered for PBV® ball valves being used in subsea service.

Large Diameter Special Features

Seat Design

The necessary thrust required for proper sealing of the seat to the ball at low pressure is provided by spiral springs (See Illustration 1). At high pressure the thrust of the seat to the ball is increased by the pressure of service medium in the pipeline.

Primary seat sealing is provided by a soft sealing ring of different rubber types. Alternatively, a PTFE hard sealing ring (or PTFE modifications) can be used for primary sealing. Secondary sealing is provided by metal-to-metal contact of the seat to the ball.

Emergency sealant, which can be injected between the seat and ball, can be used as tertiary sealing. Seats with soft sealing rings are automatically supplied as DPE design (See Illustration 2). DPE design means, that if the upstream seat is damaged, function of a ball valve is still secured by a downstream seat.

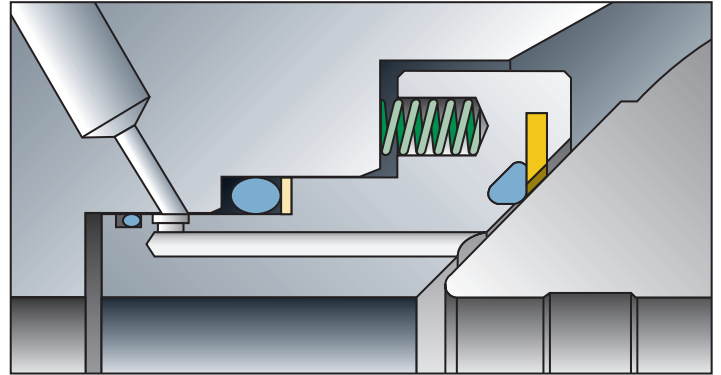


Illustration No. 1

Two-Way Double Acting

To meet customers requirements, often times a two-way seat design is required. This design allows for downstream seat sealing in the case of an upstream seat failing to seal. This design also provides for the function of testing a valve in-line and in full open position with the drain or bleed valve open to the air.

Fully Welded Body Design

Fully welded three-piece body designs are available in larger sizes.

Special Under Water Gas Testing

Valves can be air or gas tested under water in a special chamber.

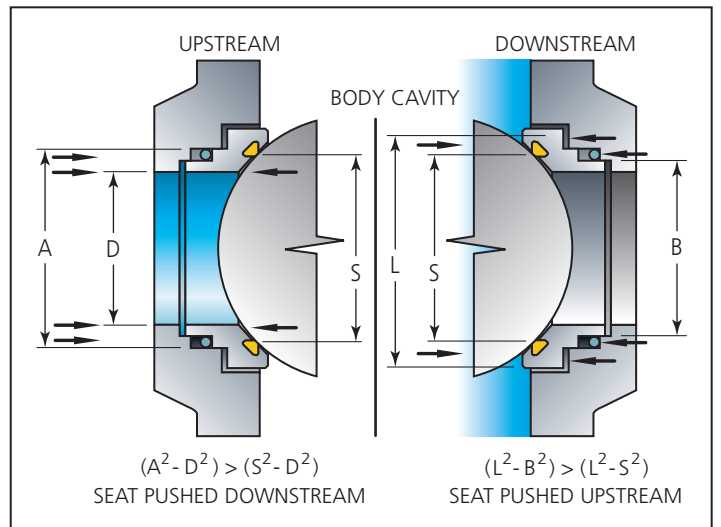
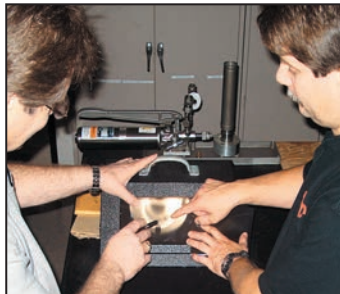
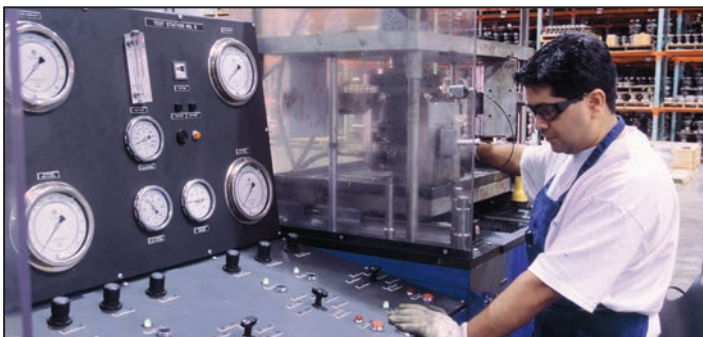


Illustration No. 2



X-ray testing and evaluation of castings are performed at PBV's Engineering and Testing Facility in Stafford, Texas.



Pressure Testing Stations and Qualified Personnel are utilized to provide consistent compliance to industry test criteria for every valve.



Design Standards and Specifications

Valve designs covered in this catalog conform to the following industry standards and specifications.

American Petroleum Institute

- API 6D • Specifications for pipeline valves
- API 607 • Fire test for soft-seated ball valves (Div. of Refining)
- API 6FA • Fire test for valves (Div. of Production)
- API Q1 • Specifications for quality programs
- API 6A • Specifications for Wellhead and Christmas Tree Equipment

Manufacturers Standardization Society

- MSS SP-25 • Standard marking system for valves
- MSS SP-55 • Quality Standard for Steel Castings

National Association of Corrosion Engineers

- NACE MR0175 2002 • Sulfide stress cracking resistant metallic materials for oilfield equipment

American National Standard

- ASME/ANSI B 16.10 • Face-to-face and end-to-end dimensions on ferrous valves
- ASME/ANSI B 16.5 • Steel pipe flanges and flanged fittings
- ASME/ANSI B 16.34 • Steel valves-flanged and butt-weld end
- ASME/ANSI B 31.1 • Power Piping
- ASME B 31.3 • Process Piping
- ASME B 31.4 • Pipeline transportation systems for liquid
- ASME B 31.8 • Gas transmission and distribution piping systems

Code of Federal Regulations

- Title 49-Part 192 • Transportation of natural and other gas by pipeline: Minimum federal safety standards

European Community

- Pressure Equipment Directive 97/23/EC



Flow Coefficients (C_v)

PBV® Series 5700/6700 Trunnion Ball Valves

C_v, by definition, is the volume of water in gallons per minute at 60°F that will flow through a given element with a pressure drop of 1 psi.

Size (in.)	Flow Coefficients (C _v) Rating					
	Cl. 150	Cl. 300	Cl. 600	Cl. 900	Cl. 1500	Cl. 2500
2x2	500	460	400	330	330	300
3x2	180	195	180	187	187	150
3x3	1350	1150	1050	935	830	740
4x3	545	535	550	510	510	410
4x4	2500	2200	1850	1760	1660	1460
6x4	790	765	745	740	740	590
6x6	5300	5290	4460	4405	4100	2600
8x6	1945	1945	2220	2035	1930	1400
8x8	10,500	9600	8730	8475	8010	5370
10x8	4050	4040	4065	4050	3860	3050
10x10	17,500	16,750	14,250	14,205	13,310	8630
12x10	6900	7100	7050	7025	6670	5350
12x12	26,300	25,500	22,550	21,430	17,070	12,500
14x12	13,100	13,200	13,350	13,300	12,630	—
14x14	31,850	30,050	28,400	26,800	24,275	—
16x14	14,600	14,580	14,300	14,200	13,490	—
16x16	43,300	41,700	38,150	36,700	33,215	—
18x16	19,750	19,800	20,350	19,750	18,760	—
18x18	57,300	55,370	50,950	48,700	43,400	—
20x18	27,750	28,050	28,300	27,300	20,470	—
20x20	74,500	72,300	65,600	62,500	55,930	—
24x20	27,100	27,130	27,250	26,900	25,500	—
24x24	112,300	109,150	98,150	94,050	84,025	—
26x24	85,270	82,470	77,630	67,880	53,190	—

Size (in.)	Flow Coefficients (C _v) Rating					
	Cl. 150	Cl. 300	Cl. 600	Cl. 900	Cl. 1500	Cl. 2500
26x26	116,800	111,900	103,750	93,240	71,670	—
28x24	62,590	61,470	59,380	53,880	43,750	—
28x28	136,850	131,600	122,650	112,200	84,220	—
30x24	49,980	49,390	48,030	44,540	37,130	—
30x30	161,700	155,650	143,200	131,500	98,390	—
32x30	143,600	137,400	128,600	116,950	90,690	—
32x32	182,650	173,300	160,450	151,250	113,800	—
34x30	109,950	107,050	101,950	94,300	76,200	—
34x34	207,800	197,800	181,550	172,950	129,550	—
36x30	90,830	88,660	85,210	78,690	65,010	—
36x32	127,750	123,350	116,650	112,150	88,850	—
36x36	233,600	219,450	199,800	197,600	145,950	—
40x36	160,850	160,850	157,250	148,650	—	—
40x40	282,300	282,300	271,550	248,400	—	—
42x40	265,250	265,250	253,450	232,050	—	—
42x42	312,350	312,350	297,100	275,550	—	—
44x40	218,100	218,100	209,800	196,700	—	—
44x44	351,600	351,600	331,000	306,400	—	—
46x46	379,700	379,700	358,450	352,400	—	—
48x42	201,050	201,050	196,400	187,150	—	—
48x44	275,950	275,950	266,850	248,200	—	—
48x48	412,500	412,500	393,150	373,200	—	—
56x56	605,150	605,150	587,750	—	—	—

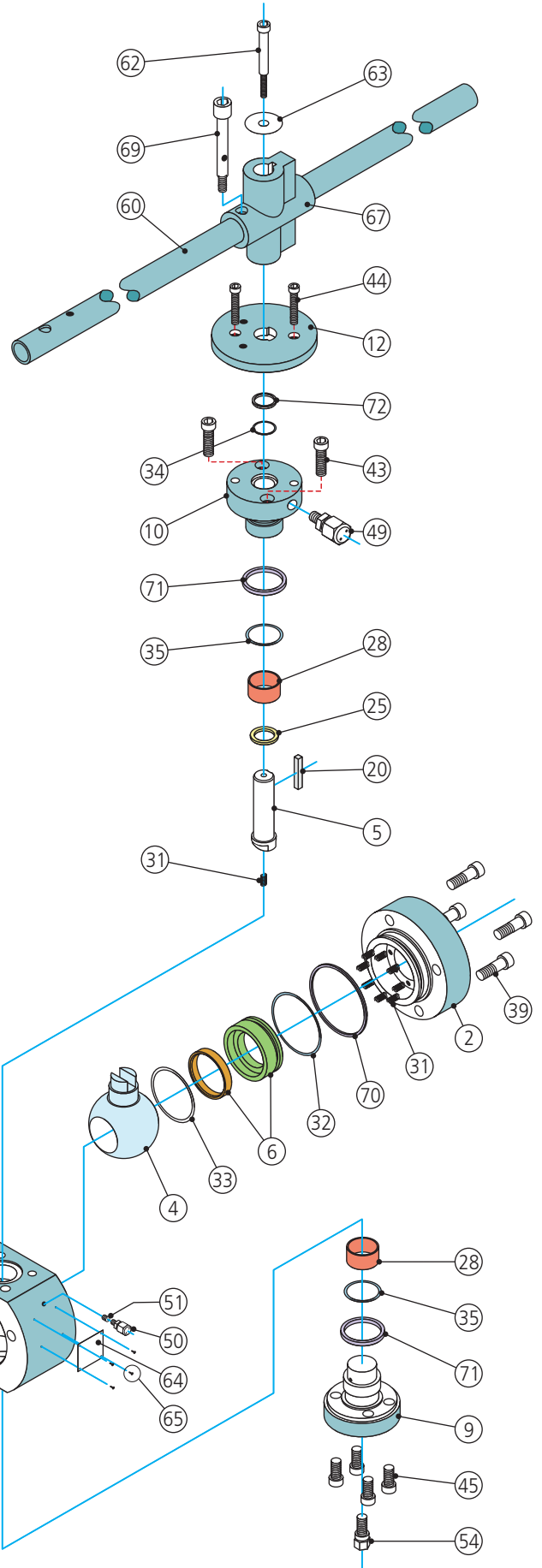
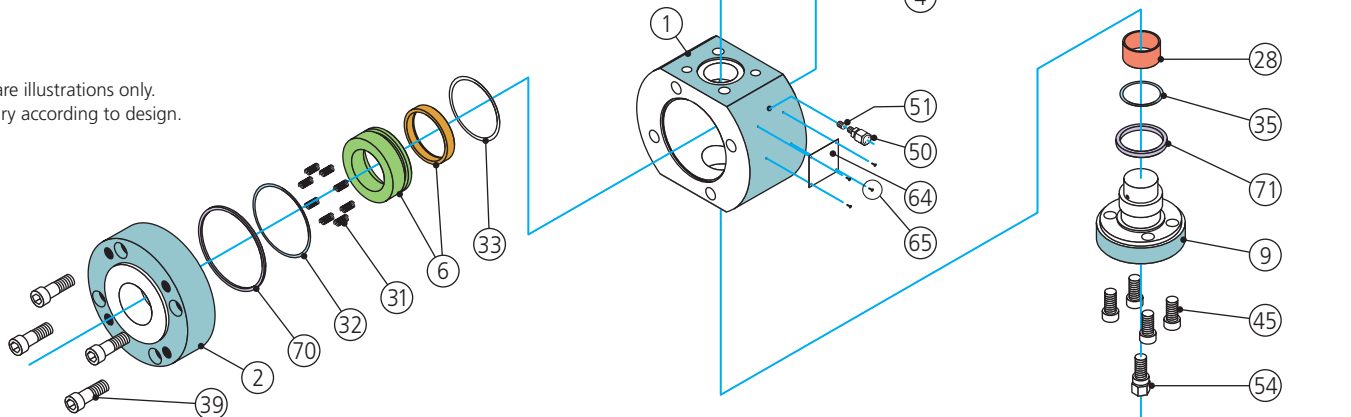
Parts for Low Pressure Small Size Diameter Valves

Series 6700 • 2"-4", Class 150 • 2", Class 300

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure	A105/A350 LF2	
4	Ball	316SS	
5	Stem	316SS	
6	Seat Ring Sub Assembly	316SS-G/PTFE	S
9	Trunnion	4130 ENP	
10	Gland	4130 ENP	
12	Adapter Plate	A36	
20	Stem Key	Carbon Steel	
25	Stem Thrust Washer	Graphite	S
28	DU Bearing	DU Dry Bearing	
31	Seat/Stem Spring	X-750	
32	Body O-ring	Viton®	S
33	Seat O-ring	Viton®	S
34	Stem O-ring	Viton®	S
35	Gland & Trunnion O-ring	Viton®	S
39	Body Cap Screw	A574 Modified	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
45	Trunnion Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
49	Stem Grease Fitting	Carbon Steel	
50	Body Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
54	Drain Valve	Carbon Steel	
60	Handle	Carbon Steel	
62	Indicator Screw	Carbon Steel	
63	Retainer Washer	Carbon Steel	
64	Name Plate	Stainless Steel	
65	Drive Screw	Stainless Steel	
67	Handle Adapter	Carbon Steel	
69	Lock Screw	Carbon Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

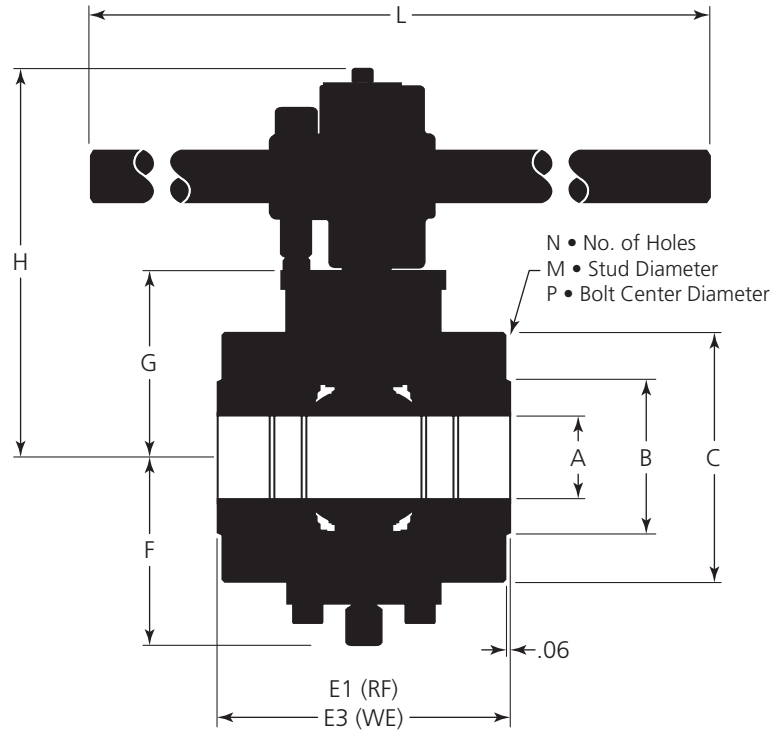
Note: Materials listed are typical for stainless steel trim valves. Stronger materials may be used to satisfy design requirements.

Assemblies are illustrations only.
Parts may vary according to design.



Dimensional Data for Low Pressure Small Size Diameter Valves

Series 6700 • 2"-4", Class 150 • 2", Class 300



Class 150, 2"FP-4"FP

Size (in.)	A	B	C	D1	E1-RF	E3-WE	F	G	H	N	M	P	L
2x2	2.00x2.00	3.62	6.00	NA	7.00	8.50	4.89	4.87	9.55	4	5/8-11 UNC	4.75	30
3x3	3.00x3.00	5.00	7.87	NA	8.00	11.12	5.87	5.94	10.92	4	5/8-11 UNC	6.00	30
4x4	4.00x4.00	6.19	9.49	NA	9.00	12.00	7.30	7.35	12.93	8	5/8-11 UNC	7.50	48

Class 300, 2"FP

Size (in.)	A	B	C	D1	E1-RF	E3-WE	F	G	H	N	M	P	L
2x2	2.00x2.00	3.62	6.50	NA	8.50	8.50	4.89	4.87	9.55	8	5/8-11 UNC	5.00	30

Small Bore Valve Design Utilizes Tapped Holes In The End Flanges to Maintain API 6D Face-to-Face Specifications

Small diameter trunnion ball valves often require tapped holes on the end flanges in order to maintain the face-to-face dimensions specified in API 6D. The full bore valves have tapped holes in accordance with API 6D instead of straight holes on both ends. The recommended stud length is listed at right.

For Reference Only Stud Length to Install Valve

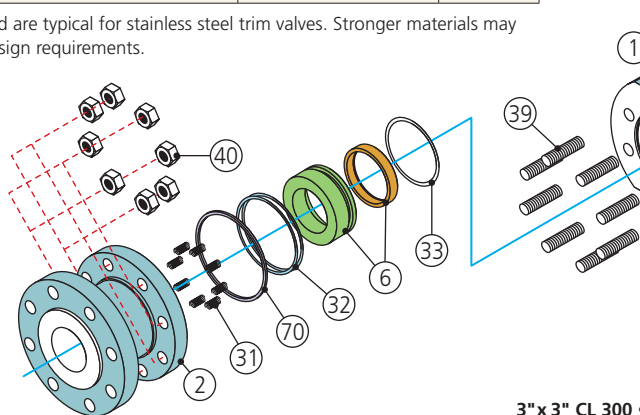
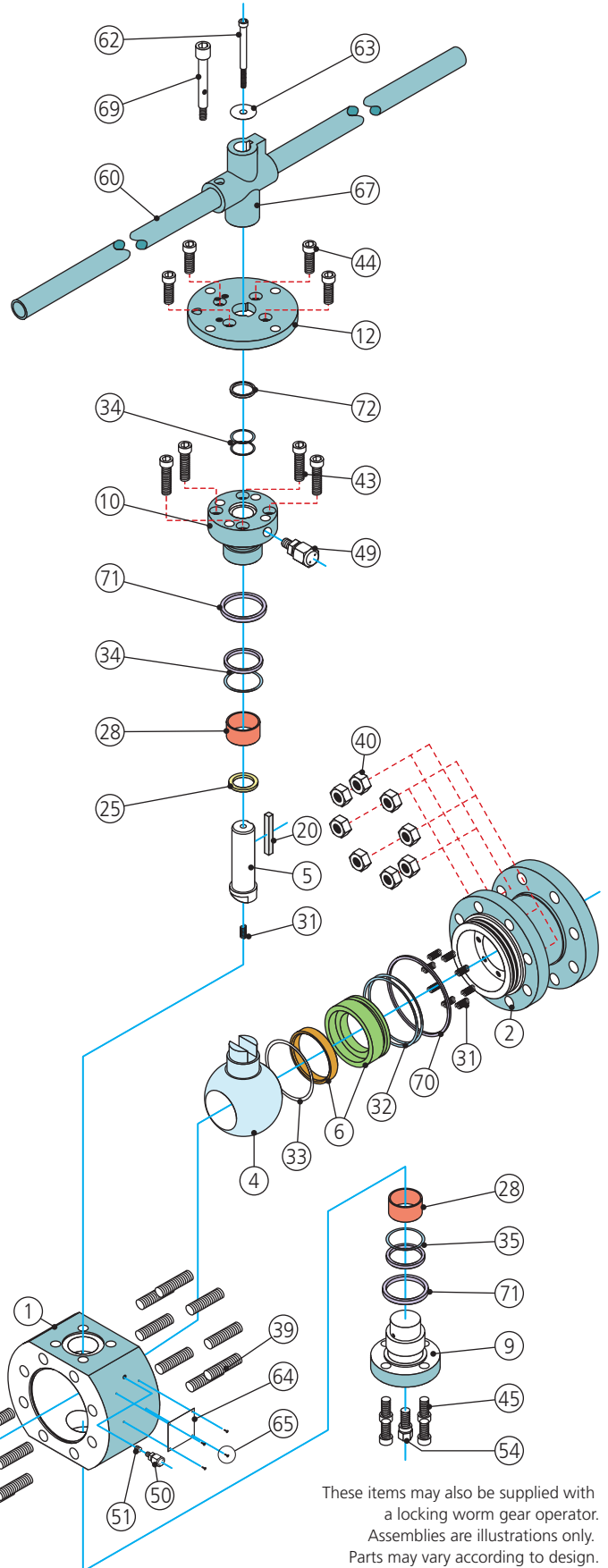
Bore Size	Stud Bolt Size	Quantity/Flange
2-150	5/8-11 UNC X 2.25	4
3-150	5/8-11 UNC X 2.38	4
4-150	5/8-11 UNC X 2.50	8
2-300	5/8-11 UNC X 2.50	8

Parts for High Pressure Small Size Diameter Valves

Series 5700/6700 • 3"FP-4"FP, Class 300 • 2"-4", Class 600, 900, 1500 and 2500

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure/Flanged End	A105/A350 LF2	
4	Ball	316SS	
5	Stem	316SS	
6	Seat Ring Sub Assembly	316SS-G/PTFE 316SS-Nylon	S
9	Trunnion	4130 ENP	
10	Gland	4130 ENP	
12	Adapter Plate	A36	
20	Stem Key	Carbon Steel	
25	Stem Thrust Washer	Graphite	S
28	DU Bearing	DU Dry Bearing	
31	Seat/Stem Spring	X-750	
32	Body O-ring	Viton®	S
33	Seat O-ring	Viton®	S
34	Stem O-ring	Viton®	S
35	Gland & Trunnion O-ring	Viton®	S
39	Body Stud	A193 B7M	
40	Body Nut	A194 2HM	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
45	Trunnion Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
49	Stem Grease Fitting	Carbon Steel	
50	Body Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
54	Drain Valve	Carbon Steel	
60	Handle	Carbon Steel	
62	Indicator Screw	Carbon Steel	
63	Retainer Washer	Carbon Steel	
64	Name Plate	Stainless Steel	
65	Drive Screw	Stainless Steel	
67	Handle Adapter	Carbon Steel	
69	Lock Screw	Carbon Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

Note: Materials listed are typical for stainless steel trim valves. Stronger materials may be used to satisfy design requirements.



These items may also be supplied with a locking worm gear operator. Assemblies are illustrations only. Parts may vary according to design.

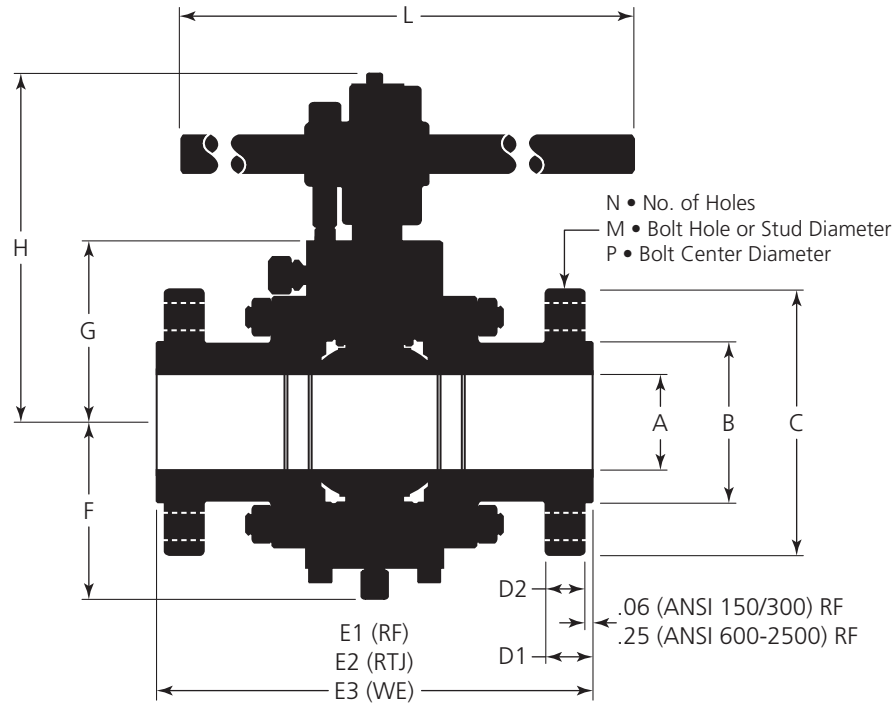
For Reference Only. 3"-4" CL 300

API flange drilled & tapped to maintain API 6D face-to-face dimension.

3"x 3" CL 300 • Use 3/4"-10 UNC x 3.38" stud. **4"x 4" CL 300** • Use 3/4"-10 UNC x 3.5" stud.

Dimensional Data for High Pressure Small Size Diameter Valves

Series 5700/6700 • 6"RP, Class 150 • 3"RP-6"RP, Class 300 • 2"FP-6"RP, Class 600



Class 150, 6"RP

Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x4	6.00x4.00	8.50	11.00	1.00	15.50	16.00	18.00	7.30	7.35	12.93	8	0.88	9.50	48

Class 300, 3"RP-6"RP

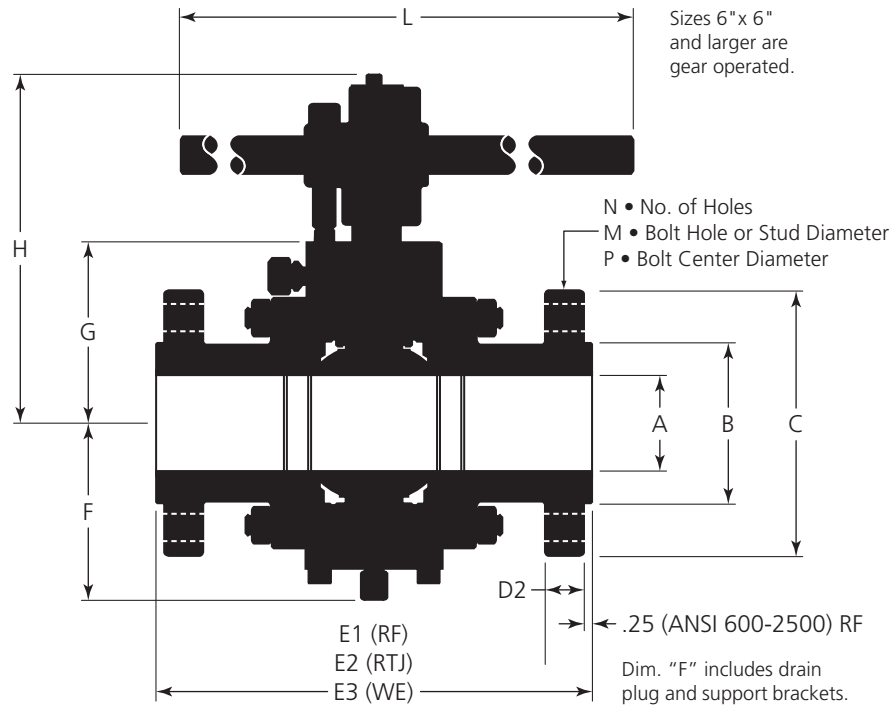
Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
3x2	3.00x2.00	5.00	8.25	1.12	11.12	11.75	11.12	4.89	4.87	9.55	8	0.88	6.62	30
3x3	3.00x3.00	5.00	8.25	1.12	11.12	11.75	11.12	5.87	5.94	10.92	8	3/4-10 UNC	6.62	30
4x3	4.00x3.00	6.19	10.00	1.25	12.00	12.62	12.00	5.87	5.94	10.92	8	0.88	7.88	30
4x4	4.00x4.00	6.19	10.00	1.25	12.00	12.62	12.00	7.30	7.35	12.93	8	3/4-10 UNC	7.88	48
6x4	6.00x4.00	8.50	12.50	1.44	15.88	16.50	18.00	7.30	7.35	12.93	12	0.88	10.62	48

Class 600, 2"FP-6"RP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
2x2	2.00x2.00	3.62	6.50	1.00	11.50	11.62	11.50	4.89	4.87	9.55	8	0.75	5.00	30
3x2	3.00x2.00	5.00	8.25	1.25	14.00	14.12	14.00	4.89	4.87	9.55	8	0.88	6.62	30
3x3	3.00x3.00	5.00	8.25	1.25	14.00	14.12	14.00	5.87	5.94	10.92	8	0.88	6.62	30
4x3	4.00x3.00	6.19	10.75	1.50	17.00	17.12	17.00	5.87	5.94	10.92	8	1.00	8.50	30
4x4	4.00x4.00	6.19	10.75	1.50	17.00	17.12	17.00	7.30	7.35	12.93	8	1.00	8.50	48
6x4	6.00x4.00	8.50	14.00	1.88	22.00	22.12	22.00	7.30	7.35	12.93	12	1.12	11.50	48

Dimensional Data for High Pressure Small Size Diameter Valves

Series 5700/6700 • 2"FP-6"RP, Class 900, 1500 and 2500



Class 900, 2"FP-6"RP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
2x2	2.00x2.00	3.62	8.50	1.50	14.50	14.62	14.50	4.89	4.87	9.55	8	1.00	6.50	30
3x2	3.00x2.00	5.00	9.50	1.50	15.00	15.12	15.00	4.89	4.87	9.55	8	1.00	7.50	30
3x3	3.00x3.00	5.00	9.50	1.50	15.00	15.12	15.00	5.87	5.94	10.92	8	1.00	7.50	30
4x3	4.00x3.00	6.19	11.50	1.75	18.00	18.12	18.00	5.87	5.94	10.92	8	1.25	9.25	30
4x4	4.00x4.00	6.19	11.50	1.75	18.00	18.12	18.00	7.30	7.35	12.93	8	1.25	9.25	48
6x4	6.00x4.00	8.50	15.00	2.19	24.00	24.12	24.00	7.30	7.35	12.93	12	1.25	12.50	48

Class 1500, 2"FP-6"RP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
2x2	2.00x2.00	3.62	8.50	1.50	14.50	14.62	14.50	5.32	5.47	10.30	8	1.00	6.50	30
3x2	3.00x2.00	5.00	10.50	1.88	18.50	18.62	18.50	5.32	5.47	10.30	8	1.25	8.00	30
3x3	3.00x3.00	5.00	10.50	1.88	18.50	18.62	18.50	6.89	6.42	11.60	8	1.25	8.00	30
4x3	4.00x3.00	6.19	12.25	2.12	21.50	21.62	21.50	6.89	6.42	11.60	8	1.38	9.50	30
4x4	4.00x4.00	6.19	12.25	2.12	21.50	21.62	21.50	8.14	7.88	13.75	8	1.38	9.50	48
6x4	5.75x4.00	8.50	15.50	3.25	27.75	28.00	27.75	8.14	7.88	13.75	12	1.50	12.50	48

Class 2500, 2"FP-6"RP

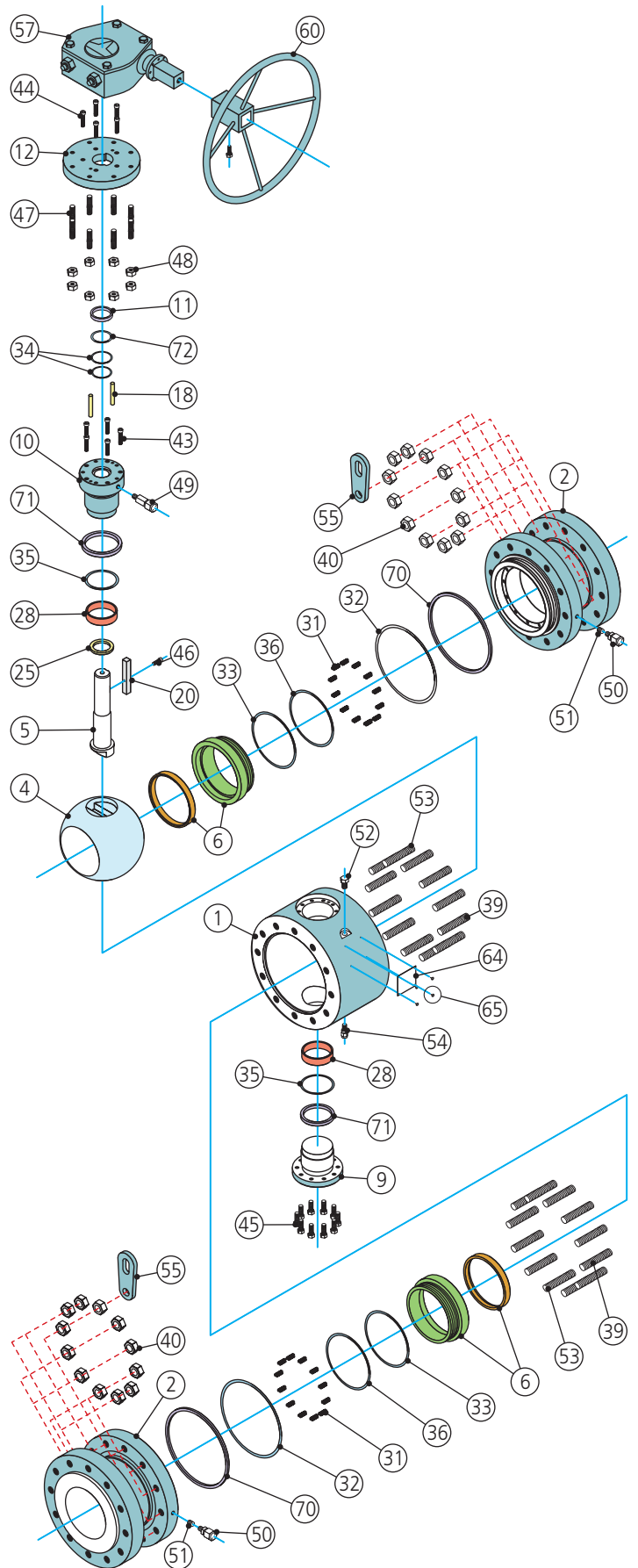
Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
2x2	1.75x1.75	3.62	9.25	2.00	17.75	17.87	17.75	6.39	7.25	13.19	8	1.12	6.75	30
3x2	2.50x1.75	5.00	12.00	2.62	22.75	23.00	22.75	6.39	7.25	13.19	8	1.38	9.00	30
3x3	2.50x2.50	5.00	12.00	2.62	22.75	23.00	22.75	8.20	8.42	14.68	8	1.38	9.00	30
4x3	3.50x2.50	6.19	14.00	3.00	26.50	26.88	26.50	8.20	8.42	14.68	8	1.63	10.75	30
4x4	3.50x3.50	6.19	14.00	3.00	26.50	26.88	26.50	9.43	10.56	16.93	8	1.63	10.75	48
6x4	5.25x3.50	8.50	19.00	4.25	36.00	36.50	36.00	9.43	10.56	16.93	8	2.12	14.50	48

Parts for Mid Size Diameter Valves

Series 5700 • 8"- 14"RP, Class 150, 300, 600, 900 and 1500 • 6"- 12"RP, Class 2500

Series 6700 • 6"- 12"FP, Class 150, 300, 600, 900 and 1500 • 6"- 10"FP, Class 2500

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure/Flanged End	A105/A350 LF2	
4	Ball	A105/A350 LF2 ENP	
5	Stem	4130 ENP	
6	Seat Ring Sub Assembly	A105/A350 LF2 ENP G/PTFE or Nylon	S
9	Trunnion	4130 ENP	
10	Gland	4130 ENP	
11	Bushing	Carbon Steel	
12	Adapter Plate	A36	
18	Gland Pin	Carbon Steel	
20	Stem Key	Carbon Steel	
25	Stem Thrust Washer	Graphite	S
28	DU Bearing	DU Dry Bearing	
31	Seat Spring	X-750	
32	Body O-ring	Viton®	S
33	Seat O-ring	Viton®	S
34	Stem O-ring	Viton®	S
35	Gland & Trunnion O-ring	Viton®	S
36	Emergency Sealant O-ring	Viton®	S
39	Body Stud	A193 B7M	
40	Body Nut	A194 2HM	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
45	Trunnion Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
47	Gear Stud	A193 B7	
48	Gear/Adapter Plate Nut	A194 2H	
49	Stem Grease Fitting	Carbon Steel	
50	Seat Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
52	Vent Plug	Carbon Steel	
53	Lifting Lug Stud	A193 B7M	
54	Drain Valve	Carbon Steel	
55	Lifting Lug	Carbon Steel	
57	Worm Gear Operator	Commercial	
60	Handwheel	Carbon Steel	
64	Name Plate	Stainless Steel	
65	Drive Screw	Stainless Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

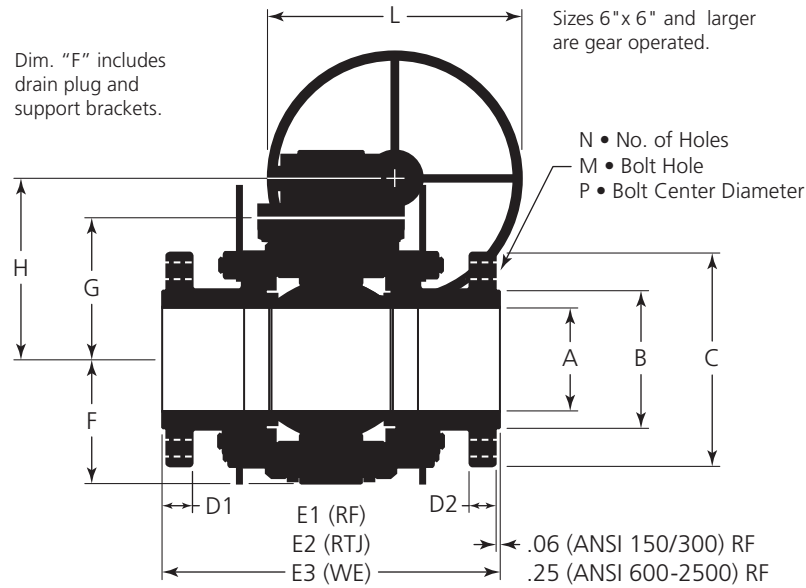


Note: Sizes 6" and 8" may be supplied with locking levers. Sizes 10" and 12" are supplied with support feet, not shown. Materials listed are typical for carbon steel valves. Ball, stem & seat rings will be 316, 17-4PH, or XM-19 for stainless steel trim depending on design requirements.

Assemblies are illustrations only.
Parts may vary according to design.

Dimensional Data for Mid Size Diameter Valves

Series 5700/6700 • 6"FP-14"RP, Class 150, 300 and 600



Class 150, 6"FP-14"RP

Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x6	6.00x6.00	8.50	11.00	1.00	15.50	16.00	18.00	7.25	8.48	10.63	8	0.88	9.50	24
8x6	8.00x6.00	10.62	13.50	1.12	18.00	18.50	20.50	7.25	8.48	10.63	8	0.88	11.75	24
8x8	8.00x8.00	10.62	13.50	1.12	18.00	18.50	20.50	8.72	10.13	12.26	8	0.88	11.75	24
10x8	10.00x8.00	12.75	16.00	1.19	21.00	21.50	22.00	8.72	10.13	12.26	12	1.00	14.25	24
10x10	10.00x10.00	12.75	16.00	1.19	21.00	21.50	22.00	10.56	11.96	14.09	12	1.00	14.25	24
12x10	12.00x10.00	15.00	19.00	1.25	24.00	24.50	25.00	10.56	11.96	14.09	12	1.00	17.00	24
12x12	12.00x12.00	15.00	19.00	1.25	24.00	24.50	25.00	12.26	13.75	15.88	12	1.00	17.00	24
14x12	13.25x12.00	16.25	21.00	1.38	27.00	27.50	30.00	12.26	13.75	15.88	12	1.12	18.75	24

Class 300, 6"FP-14"RP

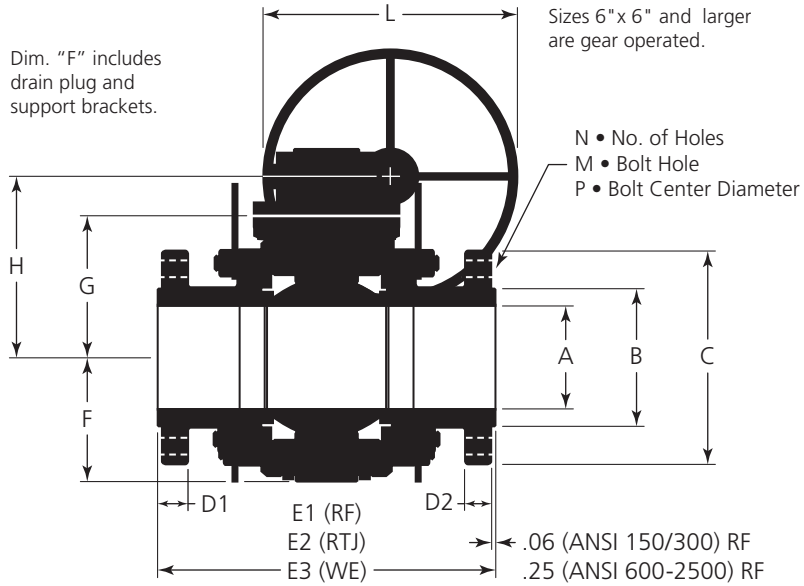
Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x6	6.00x6.00	8.50	12.50	1.44	15.88	16.50	18.00	7.25	8.48	10.63	12	0.88	10.62	24
8x6	8.00x6.00	10.62	15.00	1.62	19.75	20.38	20.50	7.25	8.48	10.63	12	1.00	13.00	24
8x8	8.00x8.00	10.62	15.00	1.62	19.75	20.38	20.50	8.72	10.13	12.26	12	1.00	13.00	24
10x8	10.00x8.00	12.75	17.50	1.88	22.38	23.00	22.00	8.72	10.13	12.26	16	1.12	15.25	24
10x10	10.00x10.00	12.75	17.50	1.88	22.38	23.00	22.00	10.56	11.96	14.09	16	1.12	15.25	24
12x10	12.00x10.00	15.00	20.50	2.00	25.50	26.12	25.00	10.56	11.96	14.09	16	1.25	17.75	24
12x12	12.00x12.00	15.00	20.50	2.00	25.50	26.12	25.00	12.26	13.75	15.88	16	1.25	17.75	24
14x12	13.25x12.00	16.25	23.00	2.12	30.00	30.62	30.00	12.26	13.75	15.88	20	1.25	20.25	30

Class 600, 6"FP-14"RP

Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x6	6.00x6.00	8.50	14.00	1.88	22.00	22.12	22.00	7.25	8.48	10.63	12	1.12	11.50	24
8x6	8.00x6.00	10.62	16.50	2.19	26.00	26.12	26.00	7.25	8.48	10.63	12	1.25	13.75	24
8x8	8.00x8.00	10.62	16.50	2.19	26.00	26.12	26.00	11.25	11.57	13.70	12	1.25	13.75	24
10x8	10.00x8.00	12.75	20.00	2.50	31.00	31.12	31.00	11.25	11.57	13.70	16	1.38	17.00	24
10x10	10.00x10.00	12.75	20.00	2.50	31.00	31.12	31.00	12.76	13.32	15.45	16	1.38	17.00	24
12x10	12.00x12.00	15.00	22.00	2.62	33.00	33.12	33.00	12.76	13.32	15.45	20	1.38	19.25	24
12x12	12.00x12.00	15.00	22.00	2.62	33.00	33.12	33.00	13.86	14.94	21.52	20	1.38	19.25	30
14x12	13.25x12.00	16.25	23.75	2.75	35.00	35.12	35.00	13.86	14.94	21.52	20	1.50	20.75	30

Dimensional Data for Mid Size Diameter Valves

Series 5700/6700 • 6"FP-14"RP, Class 900 and 1500



Class 900, 6"FP-14"RP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x6	6.00x6.00	8.50	15.00	2.19	24.00	24.12	24.00	8.62	10.01	12.14	12	1.25	12.50	24
8x6	8.00x6.00	10.62	18.50	2.50	29.00	29.12	29.00	8.62	10.01	12.14	12	1.50	15.50	24
8x8	8.00x8.00	10.62	18.50	2.50	29.00	29.12	29.00	10.00	11.57	13.70	12	1.50	15.50	24
10x8	10.00x8.00	12.75	21.50	2.75	33.00	33.12	33.00	10.00	11.57	13.70	16	1.50	18.50	24
10x10	10.00x10.00	12.75	21.50	2.75	33.00	33.12	33.00	11.74	13.32	19.90	16	1.50	18.50	30
12x10	12.00x12.00	15.00	24.00	3.12	38.00	38.12	38.00	11.74	13.32	19.90	20	1.50	21.00	30
12x12	12.00x12.00	15.00	24.00	3.12	38.00	38.12	38.00	13.86	15.46	21.52	20	1.50	21.00	30
14x12	12.75x12.00	16.25	25.25	3.38	40.50	40.88	40.50	13.86	15.46	21.52	20	1.62	22.00	30

Class 1500, 6"FP-14"RP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x6	5.75x5.75	8.50	15.50	3.25	27.75	28.00	27.75	9.72	10.67	12.80	12	1.50	12.50	24
8x6	7.63x5.75	10.62	19.00	3.62	32.75	33.13	32.75	9.72	10.67	12.80	12	1.75	15.50	24
8x8	7.63x7.63	10.62	19.00	3.62	32.75	33.13	32.75	12.16	12.88	19.46	12	1.75	15.50	30
10x8	9.50x7.63	12.75	23.00	4.25	39.00	39.38	39.00	12.16	12.88	19.46	12	2.00	19.00	30
10x10	9.50x9.50	12.75	23.00	4.25	39.00	39.38	39.00	14.40	15.48	22.06	12	2.00	19.00	30
12x10	11.38x9.50	15.00	26.50	4.88	44.50	45.12	44.50	14.40	15.48	22.06	16	2.12	22.50	30
12x12	11.38x11.38	15.00	26.50	4.88	44.50	45.12	44.50	16.98	17.83	24.41	16	2.12	22.50	30
14x12	12.50x11.38	16.25	29.50	5.25	49.50	50.25	49.50	16.98	17.83	24.41	16	2.38	25.00	30

Class 2500, 6"FP-12"RP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
6x6	5.25x5.25	8.50	19.00	4.25	36.00	36.50	36.00	12.74	12.70	19.28	8	2.12	14.50	30
8x6	7.14x5.25	10.62	21.75	5.00	40.25	40.87	40.25	12.74	12.70	19.28	12	2.12	17.25	30
8x8	7.14x7.14	10.62	21.75	5.00	40.25	40.87	40.25	15.22	16.63	18.76	12	2.12	17.25	30
10x8	8.88x7.14	12.75	26.50	6.50	50.00	50.88	50.00	15.22	16.63	18.76	12	2.62	21.25	30
10x10	8.88x8.88	12.75	26.50	6.50	50.00	50.88	50.00	19.73	18.25	24.83	12	2.62	21.25	30
12x10	10.50x8.88	15.00	30.00	7.25	56.00	56.88	56.00	19.73	18.25	24.83	12	2.88	24.38	30
12x12	10.50x10.50	15.00	30.00	7.25	56.00	56.88	56.00	22.06	20.79	27.69	12	2.88	24.38	30

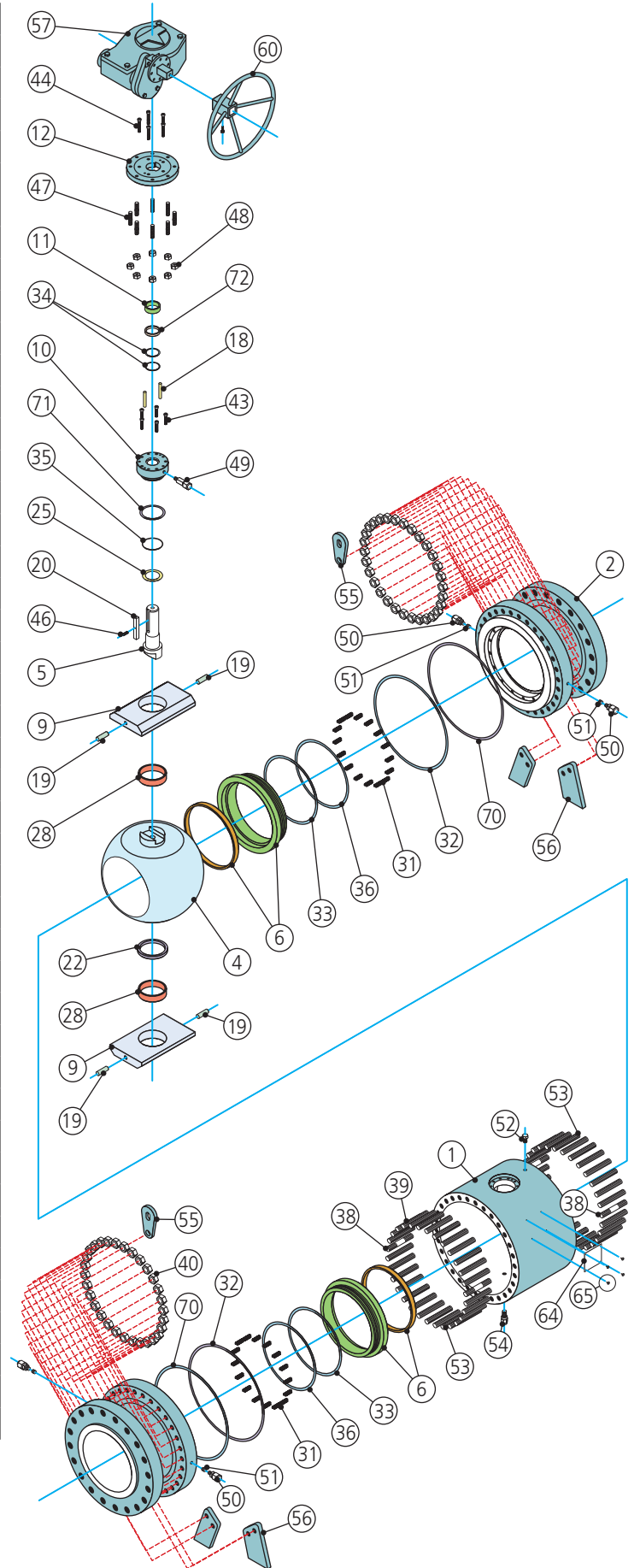
Parts for Large Size Diameter Valves

Series 5700/6700 • 14"FP-56"FP, Class 150, 300, 600, 900 and 1500 • 12", Class 2500

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure/Flanged End	A105/A350 LF2	
4	Ball	A105/A350 LF2 ENP	
5	Stem	4130 ENP	
6	Seat Ring Sub Assembly	A105/A350 LF2 ENP G/PTFE or Nylon	S
9	Bearing Retainer	Carbon Steel	
10	Gland	4130 ENP	
11	Bushing	Carbon Steel	
12	Adapter Plate	A36	
18	Gland Pin	Carbon Steel	
20	Stem Key	Carbon Steel	
22	Ball Thrust Washer	Phenolic	S
25	Stem Thrust Washer	Phenolic	S
28	DU Bearing	DU Dry Bearing	
31	Seat Spring	X-750	
32	Body O-ring	Viton®	S
33	Seat O-ring	Viton®	S
34	Stem O-ring	Viton®	S
35	Gland O-ring	Viton®	S
36	Emergency Sealant O-ring	Viton®	S
38	Location Stud	A193 B7M	
39	Body Stud	A193 B7M	
40	Body Nut	A194 2HM	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
47	Gear Stud	A193 B7	
48	Gear/Adapter Plate Nut	A194 2H	
49	Stem Grease Fitting	Carbon Steel	
50	Seat Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
52	Vent Plug	Carbon Steel	
53	Lifting Lug Stud	A193 B7M	
54	Drain Valve	Carbon Steel	
55	Lifting Lug	Carbon Steel	
56	Support Leg	Carbon Steel	
57	Worm Gear Operator	Commercial	
60	Handwheel	Carbon Steel	
64	Name Plate	Stainless Steel	
65	Drive Screw	Stainless Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

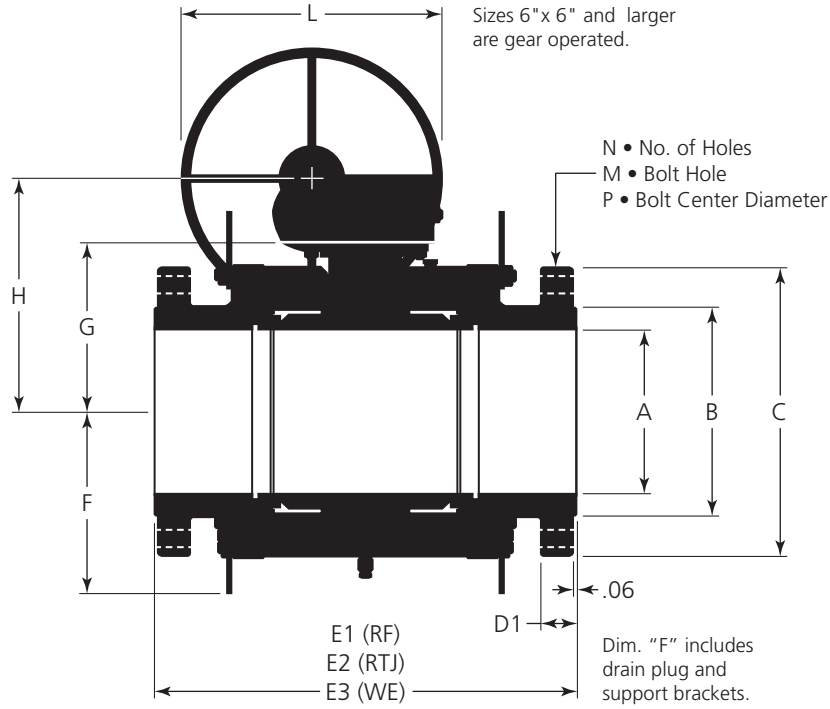
Note: Materials listed are typical for carbon steel valves. Ball, stem & seat rings will be 316, 17-4PH, or XM-19 or stainless steel trim depending on design requirements.

Assemblies are illustrations only.
Parts may vary according to design.



Dimensional Data for Large Size Diameter Valves

Series 5700/6700 • 14"FP- 56"FP, Class 150



Class 150, 14"FP- 56"FP

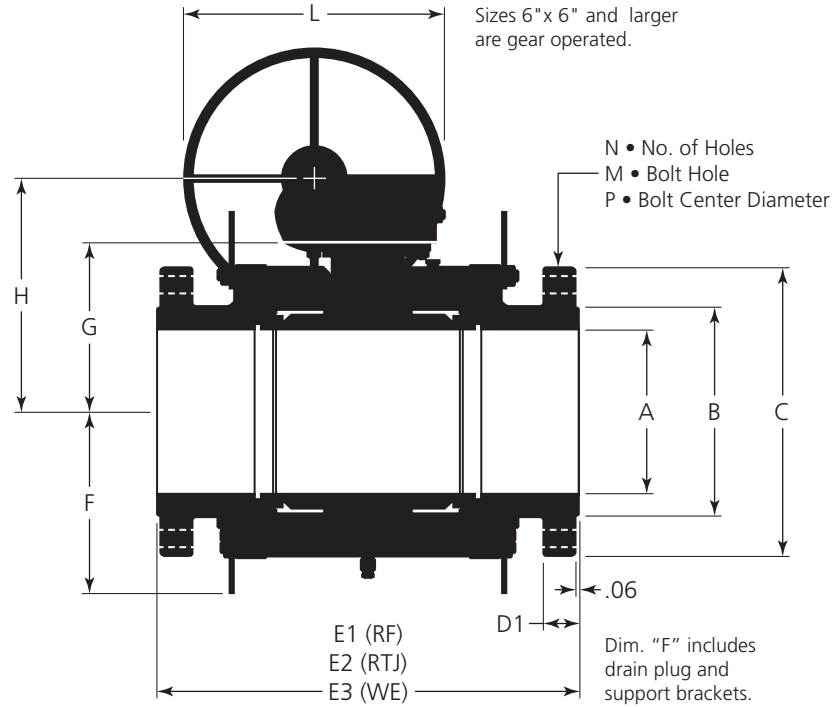
Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
14x14	13.25 x 13.25	16.25	21.00	1.38	27.00	27.50	30.00	14.92	15.18**	20.89	12	1.12	18.75	30
16x14	15.25 x 13.25	18.50	23.50	1.44	30.00	30.50	33.00	16.60	15.18**	20.89	16	1.12	21.25	30
16x16	15.25 x 15.25	18.50	23.50	1.44	30.00	30.50	33.00	16.60	15.89	22.47	16	1.12	21.25	30
18x16	17.25 x 15.25	21.00	25.00	1.56	34.00	34.50	36.00	21.05	15.89	22.47	16	1.25	22.75	30
18x18	17.25 x 17.25	21.00	25.00	1.56	34.00	34.50	36.00	21.05	19.76	26.34	16	1.25	22.75	30
20x18	19.25 x 17.25	23.00	27.50	1.69	36.00	36.50	39.00	19.67	19.76	26.34	20	1.25	25.00	30
20x20	19.25 x 19.25	23.00	27.50	1.69	36.00	36.50	39.00	19.67	20.20	26.78	20	1.25	25.00	30
24x20	23.25 x 19.25	27.25	32.00	1.88	42.00	42.50	45.00	22.75	20.20	26.78	20	1.38	29.50	30
24x24	23.25 x 23.25	27.25	32.00	1.88	42.00	42.50	45.00	22.75	23.34	30.24	20	1.38	29.50	30
30x30	29.00 x 29.00	33.75	38.75	2.88	51.00	*	55.00	31.25	32.08	38.98	28	1.38	36.00	30
36x36	34.50 x 34.50	40.25	46.00	3.50	60.00	*	68.00	34.39	35.83	42.73	32	1.62	42.75	30
40x40	38.50 x 38.50	44.25	50.75	3.50	72.83	*	70.08	36.54	37.13	*	*	*	*	*
44x44	42.32 x 42.32	49.00	55.25	3.94	76.77	*	74.80	39.76	40.39	*	*	*	*	*
48x48	45.98 x 45.98	53.50	59.50	4.19	85.83	*	82.68	41.77	43.19	*	*	*	*	*
56x56	53.62 x 53.62	62.00	68.75	4.82	90.55	*	88.58	48.50	49.92	*	*	*	*	*

*Contact your PBV® salesperson for additional sizes and materials.

**Change introduced 2004.

Dimensional Data for Large Size Diameter Valves

Series 5700/6700 • 14"FP- 56"FP, Class 300



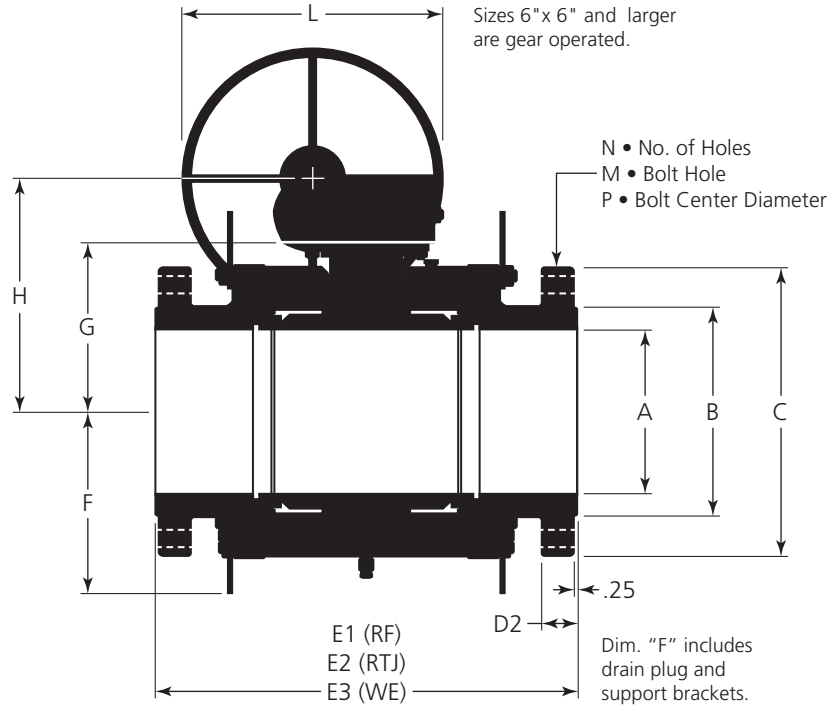
Class 300, 14"FP- 56"FP

Size (in.)	A	B	C	D1	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
14x14	13.25 x 13.25	16.25	23.00	2.12	30.00	30.62	30.00	14.92	14.31	20.89	20	1.25	20.25	30
16x14	15.25 x 13.25	18.50	25.50	2.25	33.00	33.62	33.00	16.60	14.31	20.89	20	1.38	22.50	30
16x16	15.25 x 15.25	18.50	25.50	2.25	33.00	33.62	33.00	16.60	15.89	22.47	20	1.38	22.50	30
18x16	17.25 x 15.25	21.00	28.00	2.38	36.00	36.62	36.00	21.05	15.89	22.47	24	1.38	24.75	30
18x18	17.25 x 17.25	21.00	28.00	2.38	36.00	36.62	36.00	21.05	19.76	26.34	24	1.38	24.75	30
20x18	19.25 x 17.25	23.00	30.50	2.50	39.00	39.75	39.00	19.67	19.76	26.34	24	1.38	27.00	30
20x20	19.25 x 19.25	23.00	30.50	2.50	39.00	39.75	39.00	19.67	20.20	26.78	24	1.38	27.00	30
24x20	23.25 x 19.25	27.25	36.00	2.75	45.00	45.88	45.00	22.75	20.20	26.78	24	1.62	32.00	30
24x24	23.25 x 23.25	27.25	36.00	2.75	45.00	45.88	45.00	22.75	23.34	30.24	24	1.62	32.00	30
30x30	29.00 x 29.00	33.75	43.00	3.62	55.00	56.00	55.00	31.25	32.08	38.98	28	1.88	39.25	30
36x36	34.50 x 34.50	40.25	50.00	4.12	68.00	69.12	68.00	34.39	35.83	42.73	32	2.12	46.00	30
40x40	38.50 x 38.50	42.75	48.75	4.44	72.83	*	70.08	36.54	37.13	*	*	*	*	*
44x44	42.32 x 42.32	47.00	53.25	4.82	76.77	*	74.80	39.76	40.39	*	*	*	*	*
48x48	45.98 x 45.98	51.25	57.75	5.19	85.83	*	82.68	41.77	43.19	*	*	*	*	*
56x56	53.62 x 53.62	59.75	67.25	6.00	90.55	*	88.58	48.50	49.92	*	*	*	*	*

*Contact your PBV® salesperson for additional sizes and materials.

Dimensional Data for Large Size Diameter Valves

Series 5700/6700 • 14"FP- 56"FP, Class 600



Class 600, 14"FP- 56"FP

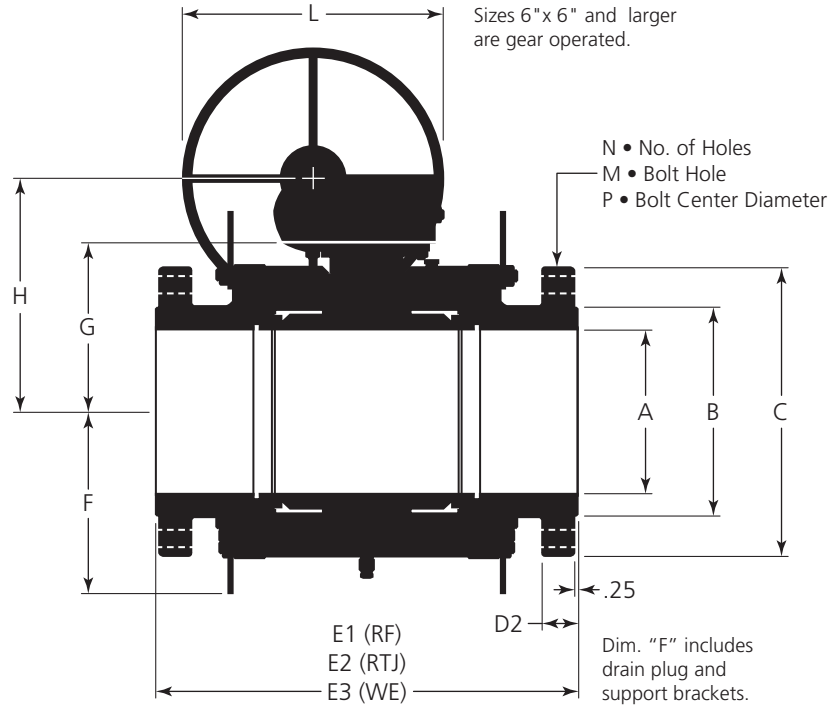
Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
14x14	13.25 x 13.25	16.25	23.75	2.75	35.00	35.12	35.00	14.92	14.31	20.89	20	1.50	20.75	30
16x14	15.25 x 13.25	18.50	27.00	3.00	39.00	39.12	39.00	16.33	14.31	20.89	20	1.62	23.75	30
16x16	15.25 x 15.25	18.50	27.00	3.00	39.00	39.12	39.00	16.33	15.89	22.47	20	1.62	23.75	30
18x16	17.25 x 15.25	21.00	29.25	3.25	43.00	43.12	43.00	21.05	15.89	22.47	20	1.75	25.75	30
18x18	17.25 x 17.25	21.00	29.25	3.25	43.00	43.12	43.00	21.05	19.76	23.20	20	1.75	25.75	30
20x18	19.25 x 17.25	23.00	32.00	3.50	47.00	47.25	47.00	19.67	19.76	23.20	24	1.75	28.50	30
20x20	19.25 x 19.25	23.00	32.00	3.50	47.00	47.25	47.00	19.67	20.09	23.53	24	1.75	28.50	30
24x20	23.25 x 19.25	27.25	37.00	4.00	55.00	55.38	55.00	23.13	20.09	23.53	24	2.00	33.00	30
24x24	23.25 x 23.25	27.25	37.00	4.00	55.00	55.38	55.00	23.13	25.35**	28.79	24	2.00	33.00	30
30x30	29.00 x 29.00	33.75	44.50	4.50	65.00	65.50	65.00	31.25	32.08	38.98	28	2.13	40.25	30
36x36	34.50 x 34.50	40.25	51.75	4.88	82.00	82.64	82.01	34.39	35.83	42.73	28	2.62	47.00	30
40x40	38.50 x 38.50	43.75	52.00	6.25	78.74	*	74.80	37.13	37.60	*	*	*	*	*
44x44	42.32 x 42.32	48.25	57.25	6.81	86.61	*	80.71	40.55	41.73	*	*	*	*	*
48x48	45.98 x 45.98	52.50	62.75	7.44	94.49	*	85.83	43.50	44.69	*	*	*	*	*
56x56	53.62 x 53.62	60.75	73.00	8.56	*	*	93.90	49.37	50.79	*	*	*	*	*

*Contact your PBV® salesperson for additional sizes and materials.

**Change introduced 2007

Dimensional Data for Large Size Diameter Valves

Series 5700/6700 • 14"FP-48"FP, Class 900 • 14"FP-24"FP, Class 1500



Class 900, 14"FP-48"FP

Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
14x14	12.75 x 12.75	16.25	25.25	3.38	40.50	40.88	40.50	18.61	16.76	23.34	20	1.62	22.00	30
16x14	14.75 x 12.75	18.50	27.75	3.50	44.50	44.88	44.50	20.63	16.76	23.34	20	1.75	24.25	30
16x16	14.75 x 14.75	18.50	27.75	3.50	44.50	44.88	44.50	20.63	18.87	25.77	20	1.75	24.25	30
18x16	16.75 x 14.75	21.00	31.00	4.00	48.00	48.50	48.00	23.39	18.87	25.77	20	2.00	27.00	30
18x18	16.75 x 16.75	21.00	31.00	4.00	48.00	48.50	48.00	23.39	24.91	31.81	20	2.00	27.00	30
20x18	18.63 x 16.75	23.00	33.75	4.25	52.00	52.50	52.00	24.30	24.91	31.81	20	2.12	29.50	30
20x20	18.63 x 18.63	23.00	33.75	4.25	52.00	52.50	52.00	24.30	26.18	33.08	20	2.12	29.50	30
24x20	22.50 x 18.63	27.25	41.00	5.50	61.00	61.75	61.00	21.70	24.20	28.90	20	2.62	35.50	30
24x24	22.50 x 22.50	27.25	41.00	5.50	61.00	61.75	61.00	28.00	27.92	30.90	20	2.62	35.50	30
30x30	28.11 x 28.11	33.75	48.50	5.88	74.00	70.16	65.35	30.94	31.42	*	*	*	*	*
36x36	33.74 x 33.74	40.25	57.50	6.75	90.00	81.89	74.80	36.38	36.14	*	*	*	*	*
40x40	37.56 x 37.56	45.75	59.50	7.75	85.83	*	82.68	39.88	39.65	*	*	*	*	*
44x44	41.26 x 41.26	50.00	64.88	8.44	93.70	*	88.58	41.26	45.28	*	*	*	*	*
48x48	45.00 x 45.00	54.50	70.25	9.19	96.46	*	93.70	47.64	47.72	*	*	*	*	*

*Contact your PBV® salesperson for additional sizes and materials.

Class 1500, 14"FP-24"FP

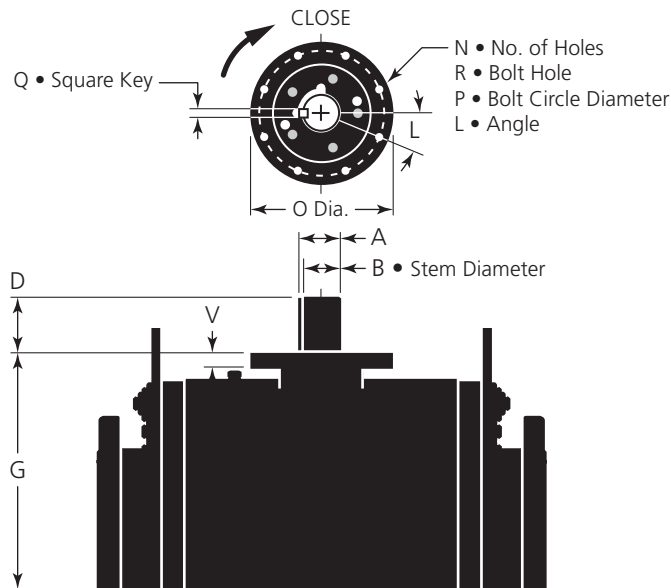
Size (in.)	A	B	C	D2	E1-RF	E2-RTJ	E3-WE	F	G	H	N	M	P	L
14x14	12.50 x 12.50	16.25	29.50	5.25	49.50	50.25	49.50	20.60	18.83	25.73	16	2.38	25.00	30
16x14	14.25 x 12.50	18.50	32.50	5.75	54.50	55.38	54.50	22.27	18.83	25.73	16	2.62	27.75	30
16x16	14.25 x 14.25	18.50	32.50	5.75	54.50	55.38	54.50	22.27	20.50	27.40	16	2.62	27.75	30
18x16	16.75 x 14.25	21.00	36.00	6.38	60.50	61.38	60.50	23.39	20.50	27.40	16	2.88	30.50	30
18x18	16.75 x 16.75	21.00	36.00	6.38	60.50	61.38	60.50	23.39	24.91	31.81	16	2.88	30.50	30
20x18	17.88 x 16.00	23.00	38.75	7.00	65.50	66.38	65.50	23.39	24.96	31.81	16	3.12	32.75	30
20x20	18.63 x 18.63	23.00	38.75	7.00	65.50	66.38	65.50	21.70	27.50	28.90	16	3.12	32.75	30
24x20	21.50 x 18.63	27.25	46.00	8.00	80.50	81.63	80.50	21.70	27.50	28.90	16	3.62	39.00	30
24x24	21.50 x 21.50	27.25	46.00	8.00	80.50	81.63	80.50	28.00	33.70	30.90	16	3.62	39.00	30

*Contact your PBV® salesperson for additional sizes and materials.

Top Works Data

Series 5700/6700

Data contained below is based on ball bore size and not end flange bore sizes. All dimensions are given in inches.



Class 150 and 300 (in.)

Size	2	3	4	6	8	10	12	14	16	18	20	24
A	1.142	1.541	1.791	1.997	2.630	2.633	2.633	3.264	3.264	3.882	3.882	3.879
B	0.979	1.373	1.570	1.765	2.362	2.362	2.362	2.950	2.950	3.540	3.540	3.540
D	1.53	1.83	1.80	3.64	3.49	3.56	3.51	4.36	4.36	5.30	5.29	5.49
G	4.87**	5.94	7.35	8.48	10.13	11.96	13.75	14.31	15.89	19.76	20.20	23.34
L	45°	45°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°
N	4	4	4	8	8	8	8	8	8	8	8	8
O	6.90	8.00	8.75	10.00	11.22	11.22	11.22	11.40	11.40	11.40	11.40	16.00
P	5.50	6.50	7.50	8.86	9.84	9.84	9.84	10.00	10.00	10.00	10.00	14.02
Q	0.315	0.394	0.394	0.500	0.625	0.625	0.625	0.750	0.750	0.875	0.875	0.875
R	0.69	0.81	0.69	0.65	0.65	0.65	0.65	0.69	0.69	0.69	0.69	1.13
V	0.53	0.60	0.53	0.91	1.09	1.09	1.09	1.35	1.35	1.00	1.00	1.00

Size	30	36	40	44	48	52	56
A	6.554	6.554	*	*	*	*	*
B	5.900	5.900	*	*	*	*	*
D	7.90	7.90	*	*	*	*	*
G	30.08	33.83	*	*	*	*	*
L	22.5°	22.5°	*	*	*	*	*
N	8	8	*	*	*	*	*
O	22.62	22.62	*	*	*	*	*
P	20.31	20.31	*	*	*	*	*
Q	1.500	1.500	*	*	*	*	*
R	1.31	1.31	*	*	*	*	*
V	2.00	2.00	*	*	*	*	*

*Contact your PBV® salesperson for additional sizes and materials.

**Lipseal design may vary.

Top Works Data, Continued

Series 5700/6700

Class 600 (in.)

Size	2	3	4	6	8	10	12	14	16	18	20	24
A	1.142	1.595	1.791	1.997	2.630	2.630	2.630	3.264	3.264	3.882	3.882	5.291
B	0.979	1.373	1.570	1.765	2.362	2.362	2.362	2.950	2.950	3.540	3.540	4.725
D	1.53	1.83	1.80	3.64	3.54	3.52	3.59	4.36	4.36	5.30	5.40	5.51
G	4.87	5.94	7.35	8.48	11.57	13.32	14.94	14.31	15.89	19.76	20.09	24.35
L	45°	45°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°
N	4	4	4	8	8	8	8	8	8	8	8	8
O	6.90	8.00	8.75	10.00	11.22	11.22	11.22	11.40	11.40	11.40	16.00	16.00
P	5.50	6.50	7.50	8.86	9.84	9.84	10.00	10.00	10.00	10.00	14.02	14.02
Q	0.315	0.394	0.394	0.500	0.625	0.625	0.625	0.750	0.750	0.875	0.875	1.250
R	0.69	0.81	0.69	0.65	0.65	0.65	0.69	0.69	0.69	0.69	1.13	1.13
V	0.53	0.60	0.53	0.91	1.09	1.09	1.09	1.35	1.35	1.00	1.00	2.00

Size	30	36	40	44	48	52	56
A	6.554	6.554	*	*	*	*	*
B	5.900	5.900	*	*	*	*	*
D	7.90	7.90	*	*	*	*	*
G	30.08	33.83	*	*	*	*	*
L	22.5°	22.5°	*	*	*	*	*
N	8	8	*	*	*	*	*
O	22.62	22.62	*	*	*	*	*
P	20.31	20.31	*	*	*	*	*
Q	1.500	1.500	*	*	*	*	*
R	1.31	1.31	*	*	*	*	*
V	2.00	2.00	*	*	*	*	*

*Contact your PBV® salesperson for additional sizes and materials.

Class 900 (in.)

Size	2	3	4	6	8	10	12*	14	16	18	20	24
A	1.142	1.595	1.791	1.997	2.630	2.630	3.261	3.882	3.882	5.291	5.291	6.550
B	0.979	1.373	1.570	1.765	2.362	2.362	2.950	3.540	3.540	4.725	4.725	5.900
D	1.53	1.83	1.80	3.75	3.54	3.52	5.56	5.03	6.03	5.44	6.66	7.905
G	4.87**	5.94	7.35	10.01	11.57	13.32	15.46	16.76	18.87	23.84	24.18	27.92
L	45°	45°	22.5°	0°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°
N	4	4	4	8	8	8	8	8	8	8	8	8
O	6.90	8.00	8.75	11.22	11.22	11.22	13.19	11.70	16.00	16.00	16.00	22.62
P	5.50	6.50	7.50	9.84	9.84	10.00	11.78	10.00	14.02	14.02	14.02	20.31
Q	0.315	0.394	0.394	0.500	0.625	0.625	0.750	0.875	0.875	1.250	1.250	1.50
R	0.69	0.81	0.69	0.69	0.65	0.69	0.81	0.69	1.12	1.12	1.12	1.31
V	0.53	0.60	0.53	1.25	1.09	1.09	1.35	1.54	1.54	2.00	1.50	2.25

Contact your PBV® salesperson for additional sizes and materials.

*Design change May 2004. Serial number required to verify design.

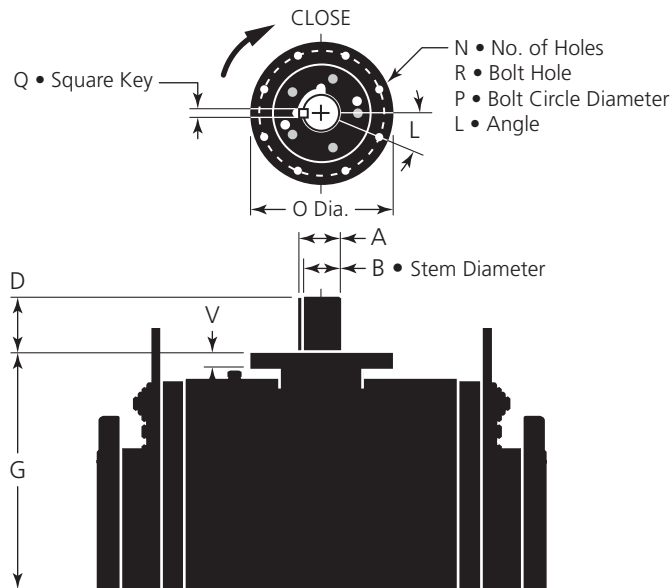
**Lip seal design may vary.

Top Works Data, Continued

Series 5700/6700

Data contained below is based on ball bore size and not end flange bore sizes. All dimensions are given in inches.

Dimensions may be changed without notice. Contact PBV® with **valve serial numbers** for exact dimensions.



Class 1500 (in.)

Size	2	3	4	6	8	10	12	14	16	18	20	24
A	1.142	1.595	1.792	2.630	3.264	3.264	3.264	3.882	3.882	5.291	5.291	6.554
B	.980	1.375	1.572	2.362	2.950	2.950	2.950	3.540	3.540	4.725	4.725	5.900
D	1.68	2.07	2.09	3.87	5.87	5.87	5.86	6.03	6.03	5.50	6.63	6.84
G	5.47	6.42	7.88	10.67	12.88	15.48	17.83	18.83	20.50	24.87	27.46	33.69
L	45°	45°	22.5°	0°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°
N	4	4	4	8	8	8	8	8	8	8	8	8
O	7.00	8.00	8.80	11.22	13.19	13.19	13.19	16.00	16.00	16.00	16.00	22.62
P	5.50	6.50	7.50	9.84	11.78	11.78	11.78	14.02	14.02	14.02	14.02	20.31
Q	0.315	0.394	0.394	.615	0.750	0.750	0.750	0.875	0.875	1.250	1.250	1.250
R	0.69	0.81	0.69	0.65	0.78	0.78	0.78	1.12	1.12	1.12	1.12	1.31
V	0.49	0.60	1.00	1.25	1.35	1.35	1.35	1.54	1.54	2.00	1.50	2.00

Class 2500 (in.)

Size	2	3	4	6	8	10	12
A	1.263	1.595	1.997	2.650	3.264	3.264	3.882
B	1.125	1.375	1.765	2.362	2.950	2.950	3.540
D	2.78	3.10	2.58	5.30	5.26	4.17	5.07
G	7.25	8.42	10.56	12.70	16.63	18.25	20.79
L*	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°
N	4	8	8	8	8	8	8
O	8.00	10.00	8.80	11.22	13.19	11.70	16.50
P	6.75	8.86	7.50	10.00	11.78	10.00	14.02
Q	0.315	0.394	0.500	0.625	0.750	0.750	0.875
R	0.66	0.66	0.69	0.69	0.78	0.69	1.12
V	0.80	0.85	0.90	1.75	1.75	1.50	1.50

*Contact factory for mounting details.

Bore Sizes • Shipping Information

Bore sizes in PBV® ball valves conform to API 6D. They present an unobstructed flow path ideally suited for pigging when ordered in the full bore configuration.

Nominal Bore Size (in.)	Actual Bore Size (in.)			
	ANSI 150-600	ANSI 900	ANSI 1500	ANSI 2500
2	2.00	2.00	2.00	1.75
3	3.00	3.00	3.00	2.50
4	4.00	4.00	4.00	3.50
6	6.00	6.00	5.75	5.25
8	8.00	8.00	7.63	7.13
10	10.00	10.00	9.50	8.88
12	12.00	12.00	11.38	10.50
14	13.25	12.75	—	—
16	15.25	14.75	—	—
18	17.25	16.75	—	—
20	19.25	18.63	—	—
24	23.25	22.50	—	—
26	25.00	—	—	—
28	27.00	—	—	—
30	29.00	—	—	—
32	30.75	—	—	—
34	32.75	—	—	—
36	34.50	—	—	—



Weight (lbs.) and Shipping Dimensions (in.)

Size	ANSI 150		ANSI 300		ANSI 600		ANSI 900		ANSI 1500		ANSI 2500	
	Wt.	Ship Dim.	Wt.	Ship Dim.	Wt.	Ship Dim.	Wt.	Ship Dim.	Wt.	Ship Dim.	Wt.	Ship Dim.
2x2	60	7x8x14	65	9x7x14	70	12x7x14	115	15x11x16	120	15x10x17	385	18x11x18
3x2	75	8x10x14	90	11x9x14	100	14x9x14	130	15x12x16	175	19x13x17	480	23x14x18
3x3	110	8x10x17	125	11x9x16	140	14x9x17	175	15x12x16	230	19x13x18	605	23x14x20
4x3	140	9x12x17	150	12x11x16	200	17x12x17	240	18x15x16	260	22x15x18	770	27x17x20
4x4	190	9x12x19	220	12x11x19	270	17x12x19	330	18x15x22	385	22x15x20	880	27x17x20
6x4	270	16x14x19	285	16x14x19	395	22x15x19	550	24x20x22	700	27x19x20	1430	37x23x20
6x6	425	16x14x19	460	16x14x20	515	22x15x19	860	24x20x25	1155	28x19x25	2100	37x23x28
8x6	505	18x18x19	575	20x17x20	675	26x18x19	1070	29x24x25	1400	33x23x25	2580	41x26x28
8x8	565	18x18x22	715	20x17x22	1140	26x18x25	1410	29x24x30	1935	33x23x30	5500	41x26x36
10x8	640	21x21x22	820	22x19x22	1420	31x22x25	1760	33x28x30	2135	39x28x30	6710	51x32x36
10x10	960	21x21x26	1175	22x19x25	1700	31x22x28	2355	33x28x33	3430	39x28x33	7400	51x32x42
12x10	1100	24x25x26	1390	26x23x25	1895	33x24x28	2530	38x31x33	3930	45x32x33	9350	57x26x42
12x12	1310	27x25x29	1740	26x23x29	2310	33x24x34	3545	38x31x36	5180	45x32x36	10,500	57x36x46
14x12	1460	27x23x29	1970	30x25x29	2575	35x26x34	3740	41x33x36	5580	50x35x36	—	—
14x14	1870	27x23x35	2240	30x25x35	2505	35x26x36	4435	41x33x38	5300	50x35x38	—	—
16x14	2025	30x26x35	2480	33x28x35	3050	39x30x36	4650	45x36x38	6700	55x39x38	—	—
16x16	2520	34x28x39	3015	33x28x39	3505	39x30x40	6260	45x36x41	9120	55x39x41	—	—
18x16	2685	34x28x39	3225	36x31x39	3900	43x32x40	6450	49x40x41	9620	61x43x41	—	—
18x18	3300	34x28x43	3750	36x31x43	4550	43x32x44	8970	49x40x41	13,020	61x43x44	—	—
20x18	3482	36x30x43	3995	39x34x43	5095	47x35x44	9150	43x44x44	13,820	66x47x44	—	—
20x20	4465	36x30x47	5105	39x34x47	6100	47x35x47	11,380	53x44x51	16,500	66x47x51	—	—
24x20	4920	42x35x47	5730	45x40x47	7325	55x41x47	11,850	62x53x51	20,500	82x55x51	—	—
24x24	6910	42x35x58	8000	45x40x58	10,800	55x41x58	18,960	62x53x55	27,500	82x55x55	—	—

Contact your PBV® salesperson for additional weights/sizes larger than 24".

- Notes:**
- 1) Weights and dimensions given for flanged end valves only.
 - 2) Valves sizes 2"x2" through 6"x4" in all Classes are with Lever Operators. Valves sizes 6"x6" and larger in all Classes are with Gear Operators.
 - 3) Shipping dimensions do not include Lever or Handwheel for Gear Operator.

The above weights and dimensions are made available for the purpose of estimating shipping expenses. These numbers are near approximations for the valve only exclusive of crating or palletizing.

Temperature Conversion Chart

Conversion Directions Locate temperature in center column. If in degrees Celsius, read Fahrenheit equivalent in right hand column.

If in degrees Fahrenheit, read Celsius equivalent in left hand column.

These formulas may be used to convert from one scale to another: Fahrenheit = (1.8 x TC) + 32 Celsius = (TF - 32)/1.8

°C		°F	°C		°F	°C		°F	°C		°F
-73.3	-100	-148.0	2.8	37	98.6	33.3	92	197.6	293	560	1040
-67.8	-90	-130.0	3.3	38	100.4	33.9	93	199.4	299	570	1058
-62.2	-80	-112.0	3.9	39	102.2	44.4	94	201.2	304	580	1076
-59.4	-75	-103.0	4.4	40	104.0	35.0	95	203.0	310	590	1094
-56.7	-70	-94.0	5.0	41	105.8	35.6	96	204.8	316	600	1112
-53.9	-65	-85.0	5.6	42	107.6	36.1	97	206.6	321	610	1130
-51.1	-60	-76.0	6.1	43	109.4	36.7	98	208.4	327	620	1148
-48.3	-55	-67.0	6.7	44	111.2	37.2	99	210.2	332	630	1166
-45.6	-50	-58.0	7.2	45	113.0	37.8	100	212.0	338	640	1184
-42.8	-45	-49.0	7.8	46	114.8	43	110	230	343	650	1202
-40.0	-40	-40.0	8.3	47	116.6	49	120	248	349	660	1220
-37.2	-35	-31.0	8.9	48	118.4	54	130	266	354	670	1238
-34.4	-30	-22.0	9.4	49	120.2	60	140	284	360	680	1256
-31.7	-25	-13.0	10.0	50	122.0	66	150	302	366	690	1274
-28.9	-20	-4.0	10.6	51	123.8	71	160	320	371	700	1292
-26.1	-15	5.0	11.1	52	125.6	77	170	338	377	710	1310
-23.3	-10	14.0	11.7	53	127.4	82	180	356	382	720	1328
-20.6	-5	23.0	12.2	54	129.2	88	190	374	388	730	1346
-17.8	0	32.0	12.8	55	131.0	93	200	392	393	740	1364
-17.2	1	33.8	13.3	56	132.8	99	210	410	399	750	1382
-16.7	2	35.6	13.9	57	134.6	100	212	414	404	760	1400
-16.1	3	37.4	14.4	58	136.4	104	220	428	410	770	1418
-15.6	4	39.2	15.0	59	138.2	110	230	446	416	780	1436
-15.0	5	41.0	15.6	60	140.0	116	240	464	421	790	1454
-14.4	6	42.8	16.1	61	141.8	121	250	482	427	800	1472
-13.9	7	44.6	16.7	62	143.6	127	260	500	432	810	1490
-13.3	8	46.4	17.2	63	145.4	132	270	518	438	820	1508
-12.8	9	48.2	17.8	64	147.2	138	280	536	443	830	1526
-12.2	10	50.0	18.3	65	149.0	143	290	554	449	840	1544
-11.7	11	51.8	18.9	66	150.8	149	300	572	454	850	1562
-11.1	12	53.6	19.4	67	152.6	154	310	590	460	860	1580
-10.6	13	55.4	20.0	68	154.4	160	320	608	466	870	1598
-10.0	14	57.2	20.6	69	156.2	166	330	626	471	880	1616
-9.4	15	59.0	21.1	70	158.0	171	340	644	477	890	1634
-8.9	16	60.8	21.7	71	159.8	177	350	662	482	900	1652
-8.3	17	62.6	22.2	72	161.6	182	360	680	488	910	1670
-7.8	18	64.4	22.8	73	163.4	188	370	698	493	920	1688
-7.2	19	66.2	23.3	74	165.2	193	380	716	499	930	1706
-6.7	20	68.0	23.9	75	167.0	199	390	734	504	940	1724
-6.1	21	69.8	24.4	76	168.8	204	400	752	510	950	1742
-5.6	22	71.6	25.0	77	170.6	210	410	770	516	960	1760
-5.0	23	73.4	25.6	78	172.4	216	420	788	521	970	1778
-4.4	24	75.2	26.1	79	174.2	221	430	806	527	980	1796
-3.9	25	77.0	26.7	80	176.0	227	440	824	532	990	1814
-3.3	26	78.8	27.2	81	177.8	232	450	842	538	1000	1832
-2.8	27	80.6	27.8	82	179.6	238	460	860	566	1050	1922
-2.2	28	82.4	28.3	83	181.4	243	470	878	593	1100	2012
-1.7	29	84.2	28.9	84	183.2	249	480	896	621	1150	2102
-1.1	30	86.0	29.4	85	185.0	254	490	914	649	1200	2192
-0.6	31	87.8	30.0	86	186.8	260	500	932	677	1250	2282
0.0	32	89.6	30.6	87	188.6	266	510	950	704	1300	2372
0.6	33	91.4	31.1	88	190.4	271	520	968	732	1350	2462
1.1	34	93.2	31.7	89	192.2	277	530	986	760	1400	2552
1.7	35	95.0	32.2	90	194.0	282	540	1004	788	1450	2642
2.2	36	96.8	32.8	91	195.8	288	550	1022	816	1500	2732

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