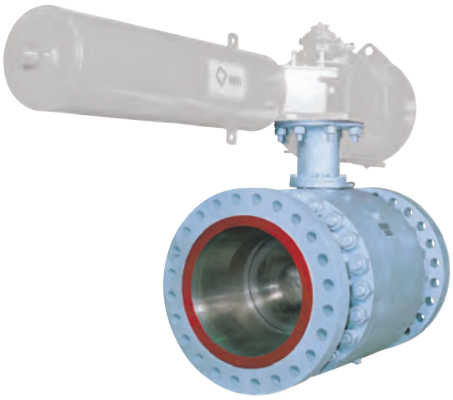
FCT TRUNNION MOUNTED SPLIT BODY BALL VALVES
MODELS HPA, HRA, DB

Higher Maximum Set Pressure, Lower Height Profile and Weight Savings



Pentair's FCT brand is a world leader in the design and manufacture of trunnion mounted ball valves for the oil and gas industry. For more than 50 years the FCT brand has been delivering high quality, innovative and competitive valve systems to the industry. FCT has continuously invested in new products and technology development and has actively worked with end-users to develop custom valves designed in accordance to customer specific requirements. Working with some of the largest energy companies, FCT has earned an excellent reputation as an international supplier of highly engineered trunnion mounted ball valves.

General application

The FCT split body trunnion mounted ball valves are widely used for upstream HIPPS, subsea, high pressure, high temperature, and cryogenic applications.

Technical data

Models:	HPA (pin trunnion) HRA (plate trunnion) DB (pin trunnion)
Sizes:	2" to 60", FB and RB
Pressure rating:	ANSI Class 150 to 2500, API 6A up to 10000 psi
Body materials:	Carbon steel, stainless steel, duplex and super duplex, special alloys Carbon steel with stainless steel or Inconel® overlay
Temp. range:	-321°F to +752°F [-196°C to +400°C]
Connections:	End to end dimensions per API 6D, ASME B16.10, API 6A Flanged RF and RTJ to ASME B16.5 (2" to 24", except 22"), MSS SP44 on 22" and ASME B16.47 (26" and above) Butt weld ends per ASME B16.25 Mechanical joint, hub on request

Features and benefits

- Guided stem design minimizes operating torques which may result in lower actuation costs and longer service life benefits.
- Additional level of safety and reliability is provided by the double piston effect. In the event a seat is damaged, sealing is assured irrespective of the flow through the valve.
- Further safety assurance is delivered by a blow-out proof stem design which is shouldered and retained within the valve body.
- Operational benefits of checking seat integrity without disturbing the status of the pipeline are possible due to the double block and bleed feature, which allows venting and draining of the body cavity in both open and closed positions.
- Seat materials:
  - Soft seat material options (PFA, PEEK, PCTFE and Devlon®)
  - Metal seats (TCC)
- Seat designs:
  - Single piston effect (standard) provides self-relieving feature of body cavity over pressurization
  - Double piston effect provides an additional level of sealing capability and reliability
- Design, manufacturing and materials comply with the Essential Safety Requirements of the 97/23/EC Directive (PED).
- All valves designed to API 6D (ISO 14313) or API 6A (ISO 10423).
- Body wall thickness complies with ASME B16.34 (forged and/or cast).
- Full and reduced bore valves available.
- Antistatic device to BS 5351 (10 Ω under 12 Volt).
- Emergency sealant injection provision (seats and stem).
- Fire-tested to API 6FA and BS 6755 Part II.
- Testing to API 6D, API 6A, API 598, ISO 5208, BS 6755 Pt.1, API 17D.
- Marking to API 6D, API 6A, MSS-SP-25, PED.
- Available with manual operation, electric, pneumatic or hydraulic actuation.

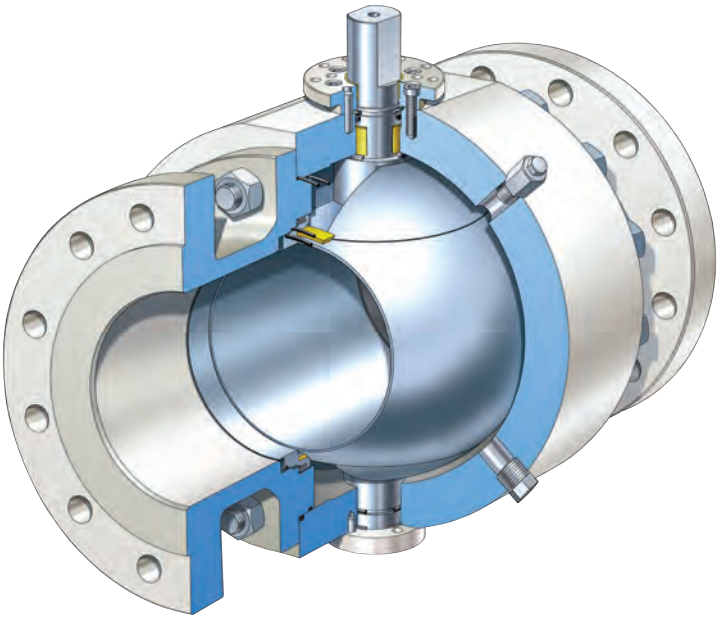
FCT

FCT TRUNNION MOUNTED SPLIT BODY BALL VALVES
MODELS HPA, HRA, DB

FCT designs are available in a wide range of materials including various grades of carbon steel, stainless steel and specialty alloys. The wide selection of materials make FCT designs the valve of choice from standard to the most corrosive and severe applications. In addition to the materials listed in the table below FCT has manufacturing experience with many different grades and special alloys, ranging from, titanium alloys, nickel copper alloys, 6Mo stainless steels as well as additional alloys.

Please contact your sales representative for additional details.

Carbon Steel	ASTM A105
Low temperature Carbon Steel	ASTM A350 Gr. LF2/LF3 ASTM A694 Gr. F42 to F70
Martensitic Stainless Steel	ASTM A182 Gr. F6A/F6NM
Martensitic precipitation-hardening Stainless Steel	ASTM A564 Gr. 630 (17-4 PH)
Austenitic Stainless Steel	ASTM A182 Gr. F316/F316L/F321
Duplex and Super Duplex Stainless Steel	ASTM A182 Gr. F51/F53/F55
Precipitation hardening iron base Superalloy	ASTM A638 Gr. 660
Nickel Chromium Alloy Incoloy® Alloy 825	Inconel® Alloy 625/718



Standards

Valve design:
- API 6D/6A
- ASME B16.34
- ASME VIII
- ASME B31.3

Pressure/Temperature rating:
ASME B16.34

Face-to-face dimensions:
Flanged: API 6D, ASME B16.10, API 6A
Butt weld: Manufacturer's standard

Flanged ends:
- ASME B16.5 (2" to 24", except 22"), MSS SP44 on 22" and ASME B16.47 (26" and above)
- API 605, API 6A

Butt weld ends:
ASME B16.25

Bleed connection sizes:
API 6D/6A, MSS SP-45

Stem and ball design:
(incl. anti-static) BS 5351

Materials:
- ASTM
- AISI
- UNS
- NACE MR 01 03

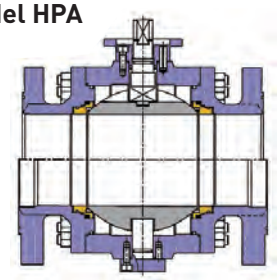
Fire testing:
- API 6FA
- API 607
- BS 6755 Part II

Testing:
- API 6D
- API 6A
- API 598
- ISO 5208
- BS 6755 Pt.1
- API 17D

Marking:
- MSS SP-25
- API 6D/6A

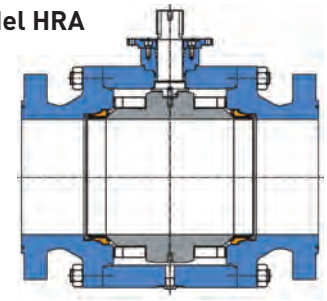
Styles

Model HPA



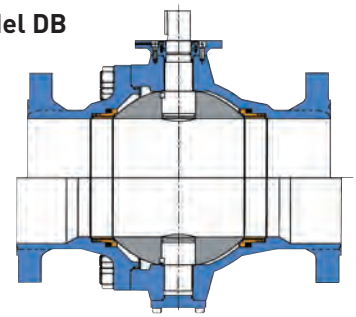
Three piece forged body design providing maximum material integrity integrating a "pin" trunnion.

Model HRA



Three piece forged body design providing maximum material integrity integrating a "plate" trunnion suitable for larger valve sizes.

Model DB



Two piece body design, providing weight optimization and fewer number of joints integrating a "pin" trunnion design. The DB body design offers the flexibility of utilizing castings or forgings, which is advantageous for the production of valves in special materials.

Principal range (full bore)

Model	Size, in [DN]		Rating
HPA	2" to 8"	[50 to 200]	ANSI 150 to 2500
HRA	10" to 16"	[250 to 400]	ANSI 150 to 900
	18" to 24"	[450 to 600]	ANSI 150 to 900
DB	2" to 24"	[50 to 600]	API 10,000
	10" to 30"	[250 to 750]	ANSI 2500
	18" to 42"	[450 to 1050]	ANSI 1500
	26" to 60"	[650 to 1500]	ANSI 150 to 900

Notes:

Illustrations represent Full bore design (top half)
Reduced bore design (bottom half)

Model DB is also used in the range 2" to 24" [50 to 600], for special material constructions, such as Duplex, Super Duplex, 6Mo, Titanium, Bronze etc.

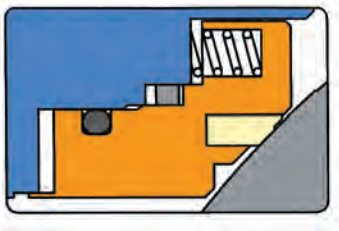
Model DB may also be constructed in a 3-piece, forged design, where this is appropriate to achieve the desired material and delivery requirements.

Standard Design Principles

Seat Ring Design

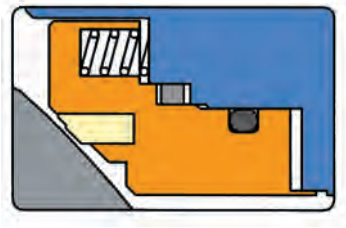
The standard seat ring of FCT trunnion mounted ball valves is designed to give the "Single Piston Effect". With upstream line pressure forcing the seat ring onto the ball, from either flow direction, a positive seal is obtained. At low upstream pressures (below 150 psi) and at the downstream seat, the seating force is provided by the seat springs.

Coil springs are utilized in all models.



Cavity Overpressure Relief

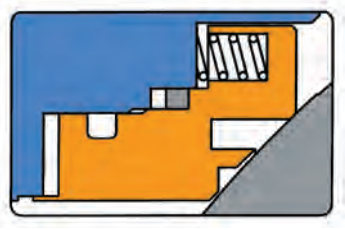
Should the pressure between the seats increase and become greater than the line pressure, or spring force, the seats are able to relieve the pressure excess to the downstream line by forcing the seat ring away from the ball. This cavity relieving mechanism automatically ensures that the valve body cannot be subject to dangerous internal overpressure.



Fire Safety

All FCT ball valves are covered by fire test certification in accordance with API 6FA, BS6755 Pt ll and API 607.

The design incorporates back-up graphite seals (behind O-rings or Lip-seals) and secondary metal to metal seating contact at the ball face.



Double Block and Bleed

Relieving the pressure between the seats, via the vent plug, will cause both seat rings to be loaded onto the ball, effecting a seal both upstream and downstream. This will occur with the valve in either the open or closed position. With the cavity pressure relieved, it will be possible to check that both seats are holding tight. Seat integrity can be checked without disturbing the pipeline status.

Drain and Vent Facilities

The standard design incorporates plugged drain ports and vent relief plugs.

Stem Arrangement

The stem and bonnet arrangement provide the anti-blowout and anti-static features required by the design specifications.

In all models the anti-blowout feature is achieved by shouldering the stem against the body.

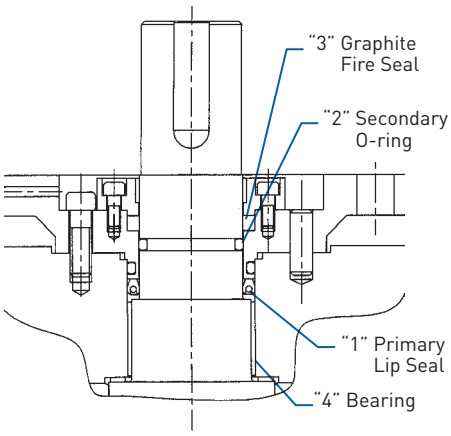
Stem Sealing

The triple stage stem sealing is comprised of a primary, self-pressurizing lip seal "**1**", with secondary O-ring "**2**", backed by a graphite seal "**3**" for fire security.

The HPA model, when lever operated, also incorporates a scraper ring, outside the stem bearing, to prevent ingress of solid materials into the stem seal mechanism.

Bearings

The differential load produced by line pressure acting on the ball, is carried by the stem and trunnion bearings "**4**". These self-lubricating,



PTFE impregnated bearings maintain low operating torque and maximize service life.

Emergency Shut Down Valves (ESDV)

Valves which are specified as ESD valves, are equipped with actuators which ensure their positive and rapid operation in an emergency.

In the case of such critical equipment, full details of the application conditions should be provided at the enquiry stage.

FCT valves are available with SIL approval to IEC 61508 Standard, for ESD service.

HIPS/HIPPS

FCT has developed procedures conforming to the High Integrity Protection System (HIPS) and the High Integrity Pressure Protection System (HIPPS), to provide the highest level of safety risk analysis for gas process and pipeline installations. FCT trunnion mounted ball valves have been assessed according to IEC 61508 and found to comply with SIL3 in the case of a single valve configuration and SIL4 where two valves are used in series.

Special Coatings

The wear resistance and corrosion resistance of seat and ball materials may be enhanced by the use of weld overlays, electroless nickel plating (ENP), tungsten carbide coating or other surface preparations, on seat ring, stem, ball and body sealing areas.

Sour Service

Valves are available, conforming to the recommendations of the NACE specification MR 01-75/ISO 15156, for use on applications where the presence of wet H_2S generates a risk of stress corrosion cracking.

HIC and SCC corrosion test certificates can be provided on request.

Explosive Decompression

Wherever valves are used in high pressure gas applications, there is the possibility of gas being absorbed into the molecular structure of elastomeric O-rings. These O-ring materials may be subject to explosive decompression.

To eliminate this possibility, special AED O-rings or lip seals, suitable for such service conditions, are available.

Transition and Pup Pieces

Valves with butt weld ends may be fitted with pup pieces in order to eliminate the risk of seat damage by heat transfer during welding and post weld heat treatment.

Similarly, transition pups may be supplied to facilitate on-site welding of valves to pipework of different materials.

Valve Accessories

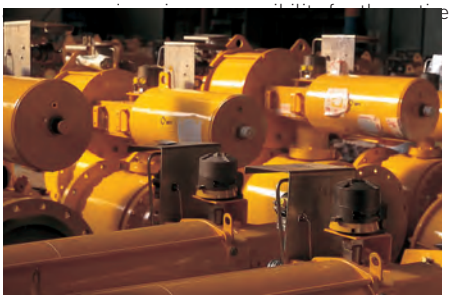
Other accessories available include:

- Locking devices
- Lifting lugs
- Support feet
- Chain wheel operation

Actuation Packages

FCT has extensive experience in delivering total control packages, including the fitting and testing of all types of actuation and a complete range of control accessories.

Fully functional test facilities enable FCT to



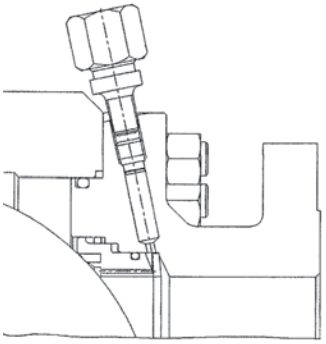
Special Applications and Options

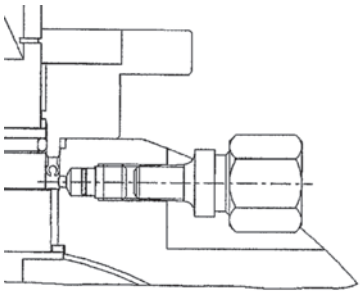
Emergency Sealant Injection

Provision is made for the injection of supplementary sealing material for emergency repair purposes, on all valves of 16" [DN 400] and above.

This facility is available, on request, on valve sizes below 14" [DN 350].

Sealant injection facilities are fitted at both seat areas and the stem seal area on sizes 6" [DN 150] and above. On sizes 2" to 4" [DN 50 to 100] sealant injection is into the body cavity.

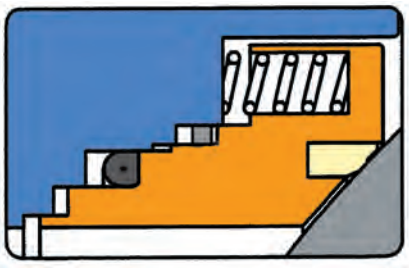




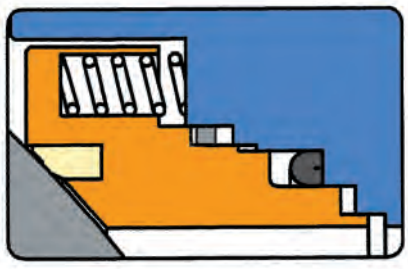
Double Piston Effect

The seat ring design may be modified to provide a Double Piston Effect (DPE). This feature adds an additional level of safety and reliability to the sealing capability of the valve, by providing a positive downstream seal in the event of an upstream failure. DPE feature allows the seat surfaces to be loaded onto the ball surface no matter which seat is subject to pressure, even if the pressure is between the seats. DPE feature eliminates the self-relieving function; therefore, it is essential to incorporate a safety relief mechanism, to prevent dangerous over-pressurization of the valve body in liquid application.

When using Double Piston Effect seats, the integrity of both seats may be confirmed by pressurizing the valve cavity (without pressurizing the whole line).



Upstream Seat



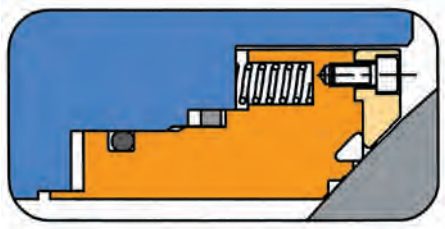
Downstream Seat

Extreme Services

For applications beyond the capabilities of soft seated valves, such as abrasive or elevated temperature service, metal seated designs are available for all sizes and pressure classes.

Metal/Soft

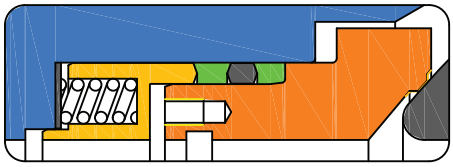
Wherever the durability of metal seating is required, but the service temperature does not preclude the use of thermoplastic seating, FCT valves may be provided with a metal/soft seat combination. The elastomeric seal provides a gas tight shut-off in normal conditions, with the back up of metal seating.



Metal/Metal

For applications where elastomeric seats would be inappropriate, such as very high pressure, temperatures above 392°F [200°C], or where solid particles are present, valves are provided with metal/metal seating, incorporating tungsten carbide coating.

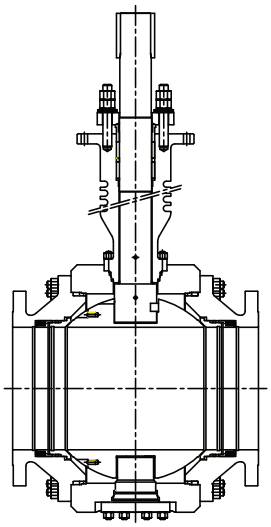
For high temperature service the valves will be fitted with extension bonnets, to attain acceptable ambient temperature and ensure the safety of the operator.



High Temperature Service

For services at temperatures above 392°F [200°C], models are available with the following features:

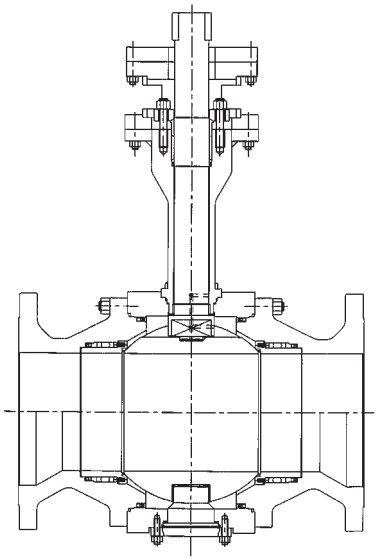
- Extended bonnet
- Graphite seals
- Tungsten carbide seat facing (150µ)
- Metallic bearings
- Dynamic, live loaded, gland bolting

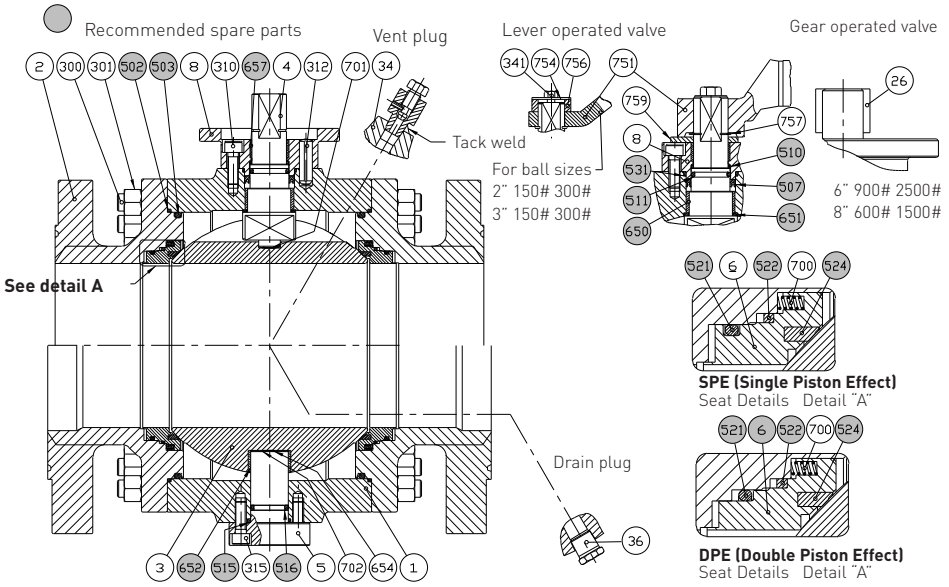


Cryogenic Temperature Service

For services at temperatures down to -321°F [-196°C], models are available with the following features:

- Extended bonnet
- Graphite seals
- PCTFE seat insert
- Dynamic, live loaded, gland bolting





Valve size range:
2" to 8" FB
3" to 10" RB

Pressure Rating:
ANSI 150 to ANSI 2500

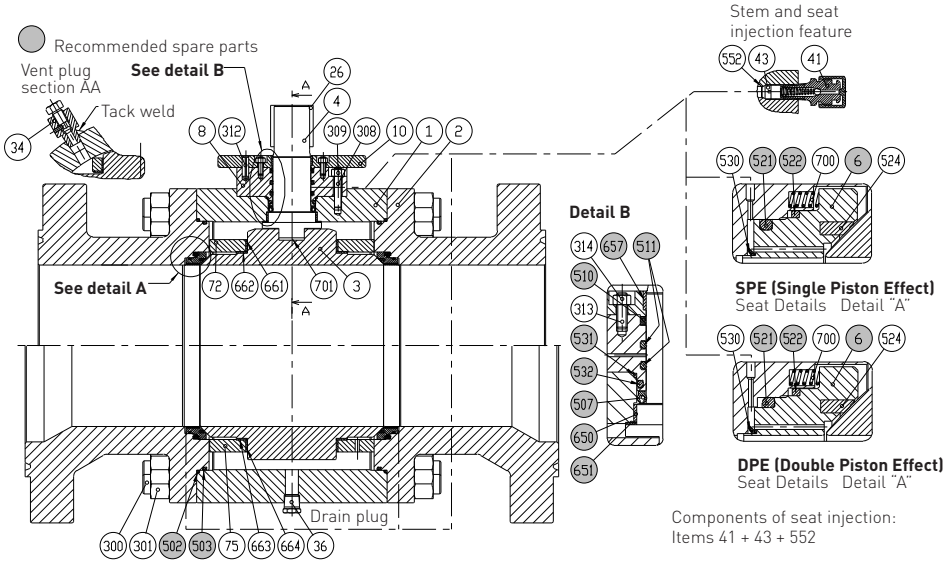
Note:

Ball and seat materials change according to the pressure rating

Valve part list with BOM – HPA model, soft seated, Class 150 to 600

Item	Qty	Designation	Carbon Steel Standard Material	Carbon Steel Body with Stainless Steel trim	Stainless Steel Standard Material see note (2)	Notes
1	1	Body	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316	
2	2	Body flange	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316	
3	1	Ball	A 350 Gr. LF2 +75µm ENP / AISI 410	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316	
4	1	Stem	A 276 Gr. UNS S41000 (AISI 410)	A 564 Gr. 630 (UNS S17400)	A 564 Gr. 630 (UNS S17400)	
5	1	Trunnion	A 276 Gr. UNS S41000 (AISI 410)	A 564 Gr. 630 (UNS S17400)	A 564 Gr. 630 (UNS S17400)	
6	2	Seat ring	A 276 Gr. UNS S41000 (AISI 410)	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316	
8	1	Adaptor flange	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316	
26	(*)	Shaft key	AISI 1048	AISI 1048	AISI 1048	
34	1	Vent plug	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316	
36	1	Drain plug	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316	
300	(*)	Stud bolt	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2	
301	(*)	Nut	ASTM A 194 Gr. 7M	ASTM A 194 Gr. 7M	ASTM A 194 Gr. 8M	
310	(*)	Screw	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2	
312	1	Pin	AISI 1075	AISI 1075	ASTM A 182 Gr. F316	
315	(*)	Screw	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2	
341	1	Screw	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2	(1)
502	2	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite	
503	2	O-ring seal	FKM	FKM	FKM	
507	1	Lip seal	PTFE + ELGILOY Spring	PTFE + ELGILOY Spring	PTFE + ELGILOY Spring	
510	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite	
511	1	O-ring seal	FKM	FKM	FKM	
515	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite	
516	1	O-ring seal	FKM	FKM	FKM	
521	2	O-ring seal	FKM	FKM	FKM	
522	2	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite	
524	2	Seat insert	PFA / PCTFE / Nylon	PFA / PCTFE / Nylon	PFA / PCTFE / Nylon	
531	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite	
650	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining	
651	1	Thrust washer	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining	
652	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining	
654	1	Thrust washer	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining	
657	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining	
700	(*)	Spring	ALLOY X 750	ALLOY X 750	ALLOY X 750	
701	1	Anti-static spring	AISI 302	AISI 302	AISI 316	
702	1	Anti-static spring	AISI 302	AISI 302	AISI 316	
751	1	Lever	C. S. Zinc Plated / Painted	C. S. Zinc Plated / Painted	C. S. Zinc Plated / Painted	(1)
754	1	Washer	C. S. Zinc Plated	C. S. Zinc Plated	C. S. Zinc Plated	(1)
756	1	Spacer	C. S. Zinc Plated	C. S. Zinc Plated	Stainless Steel	(1)
757	1	Stopper spring	Low Alloy Steel	Low Alloy Steel	Stainless Steel	(1)
759	1	Stop plate	AISI 1038 Zinc Plated	AISI 1038 Zinc Plated	AISI 1038 Zinc Plated	(1)

Notes:
*) Quantity is according with valve size and pressure rating.
1) Only supplied on lever operated valves.
2) Applicable for valve sizes 2" to 4" only. For 6" and above valve sizes, see "DB" model.



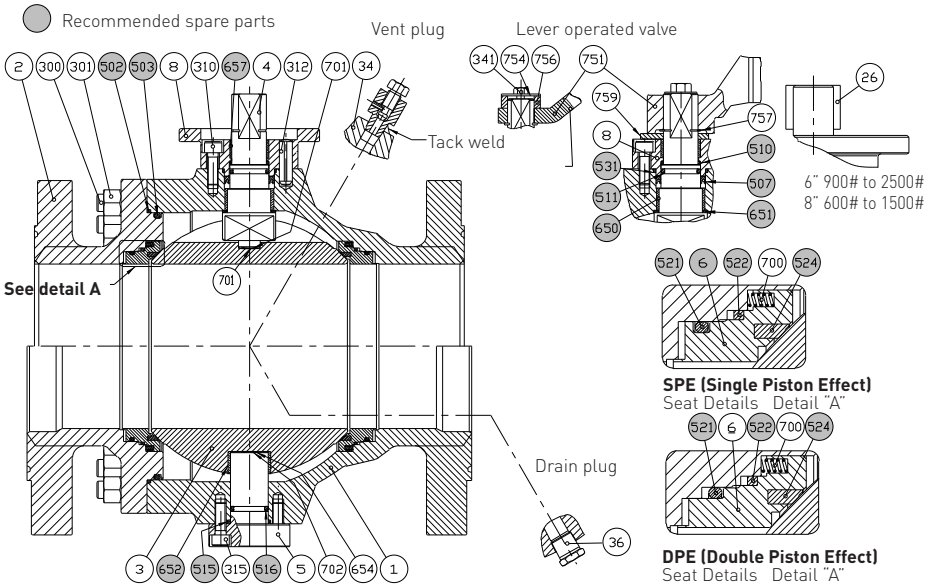
Valve size range:
10" to 24" FB
12" to 30" RB

Pressure Rating:
ANSI 150 to ANSI 600

Valve part list with BOM – HRA Model, soft seated

Item	Qty	Designation	Carbon Steel Standard Material	Carbon Steel Body with Stainless Steel trim
1	1	Body	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2
2	2	Body flange	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2
3	1	Ball	A 350 Gr. LF2 +75µm ENP / AISI 410	ASTM A 182 Gr. F316
4	1	Stem	AISI 4140 +75µm ENP / AISI 410	A 564 Gr. 630 (UNS S17400)
6	2	Seat ring	A 350 Gr. LF2 +75µm ENP / AISI 410	ASTM A 182 Gr. F316
8	1	Adaptor flange	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2
10	1	Upper cap	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2
26	(*)	Shaft key	AISI 4140	AISI 4140
34	1	Vent plug	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
36	1	Drain plug	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
41	(*)	Injection fitting	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
43	(*)	Mini check	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
72	1	Upper ball trunnion plate	ASTM A 516 Gr. 60	ASTM A 516 Gr. 60
75	1	Lower ball trunnion plate	ASTM A 516 Gr. 60	ASTM A 516 Gr. 60
300	(*)	Stud bolt	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M
301	(*)	Nut	ASTM A 194 Gr. 7M	ASTM A 194 Gr. 7M
308	(*)	Stud bolt	ASTM A 320 Gr. B8M	ASTM A 320 Gr. B8M
309	(*)	Nut	ASTM A 194 Gr. 8M	ASTM A 194 Gr. 8M
312	2	Pin	AISI 1075	AISI 1075
313	(*)	Stud bolt	ASTM A 320 Gr. B8M	ASTM A 320 Gr. B8M
314	(*)	Nut	ASTM A 194 Gr. 8M	ASTM A 194 Gr. 8M
502	2	Fire-safe gasket	Expanded Graphite	Expanded Graphite
503	2	O-ring seal	FKM	FKM
507	1	Lip seal	PTFE + ELGILOY Spring	PTFE + ELGILOY Spring
510	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite
511	2	O-ring seal	FKM	FKM
521	2	O-ring seal	FKM	FKM
522	2	Fire-safe gasket	Expanded Graphite	Expanded Graphite
524	2	Seat insert	PFA / PCTFE / Nylon	PFA / PCTFE / Nylon
530	2	Garter ring	PTFE	PTFE
531	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite
532	1	O-ring seal	FKM	FKM
552	(*)	Gasket	PTFE	PTFE
650	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining
651	1	Thrust washer	C. S + PTFE Lining	C. S + PTFE Lining
657	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining
661	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining
662	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining
663	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining
664	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining
700	(*)	Spring	Alloy X 750	Alloy X 750
701	1	Anti-static spring	AISI 302	AISI 302

Notes:
(*) Quantity is according with valve size and pressure rating.
- For Stainless Steel (std. material), Refer to DB model.



Valve size range:
6" to 8" FB
8" to 10" RB

Pressure Rating:
ANSI 150 to ANSI 2500

Note:

Ball and seat materials change according to the pressure rating

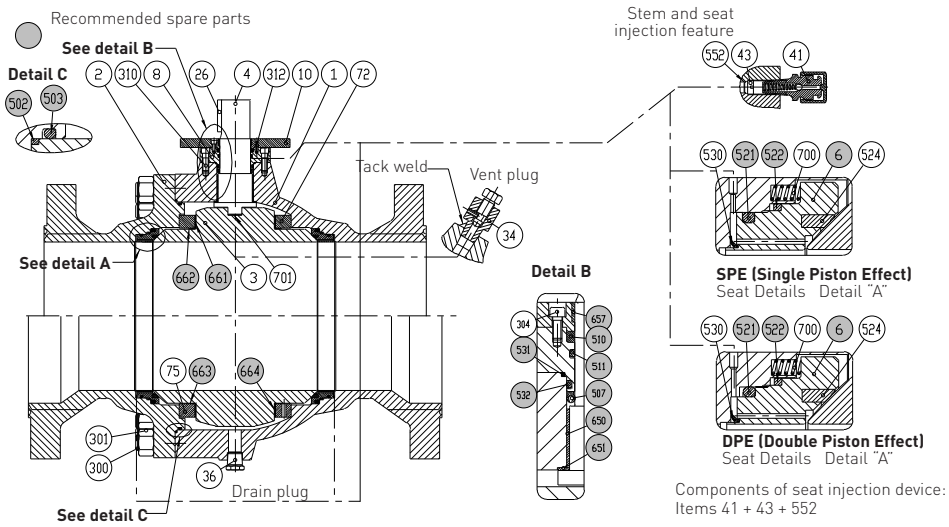
Valve part list with BOM – DB Model, soft seated, Class 150 to 600

Item	Qty	Designation	Stainless Steel Standard Material	Notes
1	1	Body	ASTM A 351 Gr. CF8M	
2	1	Body flange	ASTM A 351 Gr. CF8M	
3	1	Ball	ASTM A 182 Gr. F316	
4	1	Stem	A 564 Gr. 630 (UNS S17400)	
5	1	Trunnion	A 564 Gr. 630 (UNS S17400)	
6	2	Seat ring	ASTM A 182 Gr. F316	
8	1	Adaptor flange	ASTM A 182 Gr. F316	
26	(*)	Shaft key	AISI 1048	
34	1	Vent plug	ASTM A 182 Gr. F316	
36	1	Drain plug	ASTM A 182 Gr. F316	
300	(*)	Stud bolt	ASTM A 320 Gr. B8M Class 2	
301	(*)	Nut	ASTM A 194 Gr. 8M	
310	(*)	Screw	ASTM A 320 Gr. B8M Class 2	
312	1	Pin	ASTM A 182 Gr. F316	
315	(*)	Screw	ASTM A 320 Gr. B8M Class 2	
341	1	Screw	ASTM A 320 Gr. B8M Class 2	(1)
502	1	Fire-safe gasket	Expanded Graphite	
503	1	O-ring seal	FKM	
507	1	Lip seal	PTFE + ELGILOY Spring	
510	1	Fire-safe gasket	Expanded Graphite	
511	1	O-ring seal	FKM	
515	1	Fire-safe gasket	Expanded Graphite	
516	1	O-ring seal	FKM	
521	2	O-ring seal	FKM	
522	2	Fire-safe gasket	Expanded Graphite	
524	2	Seat insert	PFA / PCTFE / Nylon	
531	1	Fire-safe gasket	Expanded Graphite	
650	1	Bearing	316 SS + PTFE Lining	
651	1	Thrust washer	316 SS + PTFE Lining	
652	1	Bearing	316 SS + PTFE Lining	
654	1	Thrust washer	316 SS + PTFE Lining	
657	1	Bearing	316 SS + PTFE Lining	
700	(*)	Spring	Alloy X 750	
701	1	Anti-static spring	AISI 316	
702	1	Anti-static spring	AISI 316	
751	1	Lever	C. S. Zinc Plated / Painted	(1)
754	1	Washer	C. S. Zinc Plated	(1)
756	1	Spacer	Stainless Steel	(1)
757	1	Stopper spring	Stainless Steel	(1)
759	1	Stop plate	AISI 1038 Zinc Plated	(1)

Notes:

(*) Quantity is according with valve size and pressure rating.
(1) Only supplied on lever operated valves.

- For Carbon Steel (std. material), refer to HPA Model
- For Carbon Steel Body with stainless steel trim, refer to HPA Model



Valve size range:
10" to 24" FB
12" to 30" RB

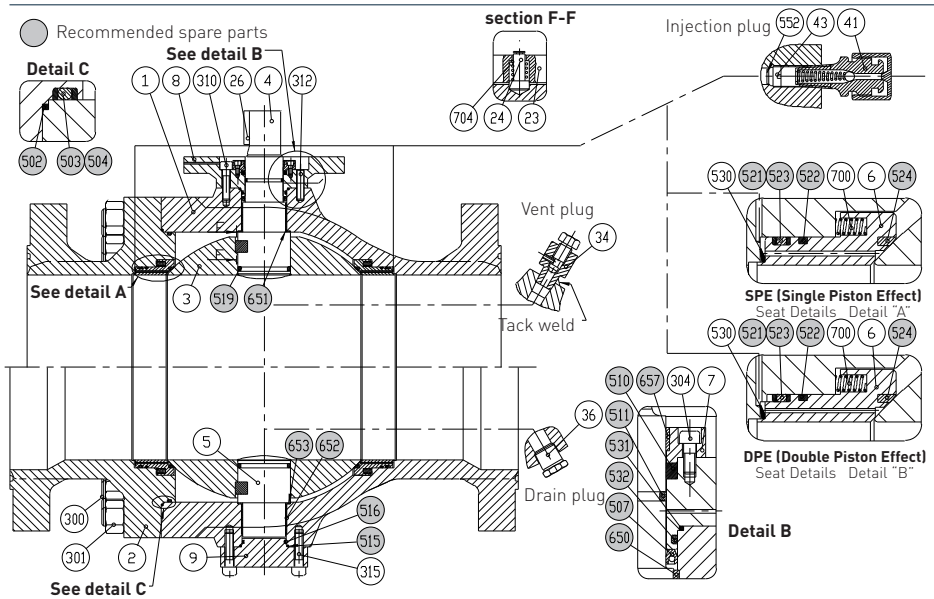
Pressure Rating:
ANSI 150 to ANSI 600

Valve part list with BOM – DB Model, soft seated

Item	Qty	Designation	Stainless Steel Standard Material
1	1	Body	ASTM A 351 Gr. CF8M
2	1	Body flange	ASTM A 351 Gr. CF8M
3	1	Ball	ASTM A 182 Gr. F316
4	1	Stem	A 564 Gr. 630 (UNS S17400)
6	2	Seat ring	ASTM A 182 Gr. F316
8	1	Adaptor flange	ASTM A 182 Gr. F316
10	1	Upper cap	ASTM A 182 Gr. F316
26	(*)	Shaft key	AISI 4140
34	1	Vent plug	ASTM A 182 Gr. F316
36	1	Drain plug	ASTM A 182 Gr. F316
41	(*)	Injection fitting	ASTM A 182 Gr. F316
43	(*)	Mini check	ASTM A 182 Gr. F316
72	1	Upper ball trunnion plate	AISI 316
75	1	Lower ball trunnion plate	AISI 316
300	(*)	Stud bolt	ASTM A 320 Gr. B8M Class 2
301	(*)	Nut	ASTM A 194 Gr. 8M
304	(*)	Screw	ASTM A 320 Gr. B8M Class 2
310	(*)	Screw	ASTM A 194 Gr. 8M
312	2	Pin	AISI 316
502	1	Fire-safe gasket	Expanded Graphite
503	1	O-ring seal	FKM
507	1	Lip seal	PTFE + ELGILOY Spring
510	1	Fire-safe gasket	Expanded Graphite
511	2	O-ring seal	FKM
521	2	O-ring seal	FKM
522	2	Fire-safe gasket	Expanded Graphite
524	2	Seat insert	PFA / PCTFE / Nylon
530	2	Garter ring	PTFE
531	1	Fire-safe gasket	Expanded Graphite
532	1	O-ring seal	FKM
552	(*)	Gasket	PTFE
650	1	Bearing	316 SS + PTFE Lining
651	1	Thrust washer	316 SS + PTFE Lining
657	1	Bearing	316 SS + PTFE Lining
661	1	Bearing	316 SS + PTFE Lining
662	1	Bearing	316 SS + PTFE Lining
663	1	Bearing	316 SS + PTFE Lining
664	1	Bearing	316 SS + PTFE Lining
700	(*)	Spring	Alloy X 750
701	1	Anti-static spring	AISI 302

Notes:
(*) Quantity is according with valve size and pressure rating.
- For Carbon Steel (std. material) and Carbon Steel Body with stainless steel trim, refer to HPA Model

FCT TRUNNION MOUNTED SPLIT BODY BALL VALVES
MODELS HPA, HRA, DB



Valve size range:
26" to 60" FB
28" to 60" RB

Pressure Rating:
ANSI 150 to ANSI 2500

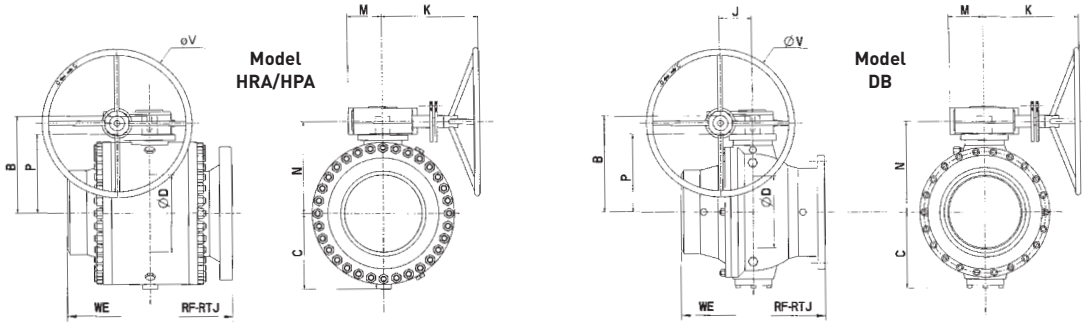
Note:

Ball and seat materials change according to the pressure rating

Valve part list with BOM – DB Model, soft seated, Class 150 to 600

Item	Qty	Designation	Carbon Steel Standard Material	Carbon Steel Body with Stainless Steel trim	Stainless Steel Standard Material
1	1	Body	ASTM A 352 Gr. LCC	ASTM A 352 Gr. LCC	ASTM A 351 Gr. CF8M
2	1	Body flange	ASTM A 352 Gr. LCC	ASTM A 352 Gr. LCC	ASTM A 351 Gr. CF8M
3	1	Ball	ASTM A 350 Gr. LF2 +75µm ENP	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
4	1	Stem	A 276 Gr. UNS S41000 (AISI 410)	A 564 Gr. 630 (UNS S17400)	A 564 Gr. 630 (UNS S17400)
5	1	Trunnion	A 276 Gr. UNS S41000 (AISI 410)	A 564 Gr. 630 (UNS S17400)	A 564 Gr. 630 (UNS S17400)
6	2	Seat ring	A 276 Gr. UNS S41000 (AISI 410)	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
7	1	Cover	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316
8	1	Adaptor flange	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316
9	1	Lower cap	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316
23	2	Ball key	ASTM A 182 Gr. F51	ASTM A 182 Gr. F51	A 564 Gr. 630 (UNS S17400)
24	2	Pin	ASTM A 182 Gr. F51	ASTM A 182 Gr. F51	A 564 Gr. 630 (UNS S17400)
26	(*)	Shaft key	AISI 1048	AISI 1048	AISI 1048
34	1	Vent plug	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316
36	1	Drain plug	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316
41	(*)	Injection fitting	ASTM A 350 Gr. LF2	ASTM A 350 Gr. LF2	ASTM A 182 Gr. F316
43	(*)	Mini check	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316	ASTM A 182 Gr. F316
300	(*)	Stud bolt	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2
301	(*)	Nut	ASTM A 194 Gr. 7M	ASTM A 194 Gr. 7M	ASTM A 194 Gr. 8M
304	(*)	Screw	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2
310	(*)	Screw	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2
312	(*)	Pin	AISI 1075	AISI 1075	AISI 316
315	(*)	Screw	ASTM A 320 Gr. L7M	ASTM A 320 Gr. L7M	ASTM A 320 Gr. B8M Class 2
502	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite
503	1	O-ring seal	FKM	FKM	FKM
504	2	Back-up ring	PCTFE / Nylon	PCTFE / Nylon	PCTFE / Nylon
507	1	Lip seal	PTFE + ELGILOY Spring	PTFE + ELGILOY Spring	PTFE + ELGILOY Spring
510	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite
511	1	O-ring seal	FKM	FKM	FKM
515	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite
516	1	O-ring seal	FKM	FKM	FKM
519	2	O-ring seal	FKM	FKM	FKM
521	2	O-ring seal	FKM	FKM	FKM
522	2	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite
523	4	Back-up ring	PCTFE / Nylon	PCTFE / Nylon	PCTFE / Nylon
524	2	Seat insert	PFA / PCTFE / Nylon	PFA / PCTFE / Nylon	PFA / PCTFE / Nylon
530	2	Garter ring	PTFE	PTFE	PTFE
531	1	Fire-safe gasket	Expanded Graphite	Expanded Graphite	Expanded Graphite
532	1	O-ring seal	FKM	FKM	FKM
552	(*)	Gasket	PTFE	PTFE	PTFE
650	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining
651	1	Thrust washer	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining
652	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining
653	1	Thrust washer	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining
657	1	Bearing	C. S + PTFE Lining	C. S + PTFE Lining	316 SS + PTFE Lining
700	(*)	Spring	Alloy X 750	Alloy X 750	Alloy X 750
704	2	Anti-static spring	Alloy X 750	Alloy X 750	Alloy X 750

Note:
(*) Quantity is according with valve size and pressure rating.



Dimensions ANSI 150 – Full Bore 2" to 60" – Reduced Bore 3" to 60" – Models HRA, HPA and DB

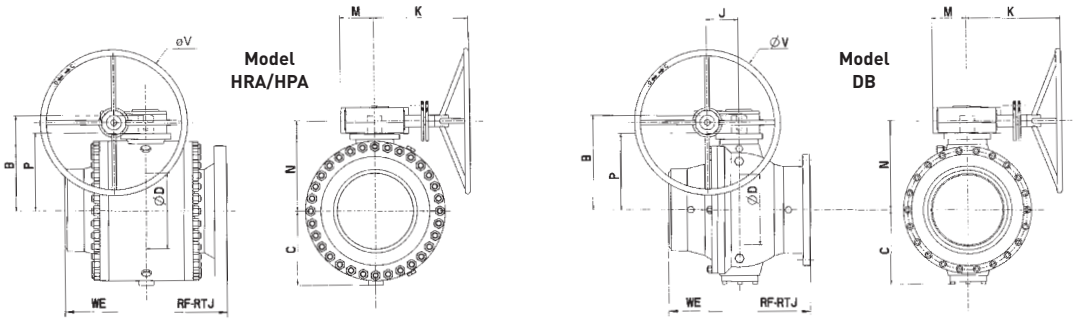
	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight lb. RF-RTJ	Weight lb. WE	Weight lb. Gear operator
ANSI 150	2" [50]	FB	7,01	7,52	8,50	5,04	3,43	2,01	(1)	(1)	14,57	(1)	6,38	4,06	(1)	46	83	(1)
	3"	RB	7,99	8,50	11,14	5,04	3,43	2,01	(1)	(1)	14,57	(1)	6,38	4,06	(1)	57	83	(1)
	[80]	FB	7,99	8,50	11,14	5,91	4,49	2,99	(1)	(1)	14,57	(1)	7,13	4,80	(1)	84	141	(1)
	4"	RB	9,02	9,49	12,01	5,91	4,49	2,99	(1)	(1)	14,57	(1)	7,13	4,80	(1)	95	156	(1)
	[100]	FB	9,02	9,49	12,01	7,24	5,04	4,02	(1)	(1)	19,69	(1)	7,17	5,91	(1)	110	190	(1)
	6"	RB	15,51	15,98	17,99	7,24	5,04	4,02	(1)	(1)	19,69	(1)	7,17	5,91	(1)	161	277	(1)
	[150]	FB	15,51	15,98	17,99	9,49	7,28	5,98	(1)	(1)	35,43	(1)	9,29	7,91	(1)	331	651	(1)
	8"	RB	17,99	18,50	20,51	9,49	7,28	5,98	(1)	(1)	35,43	(1)	9,29	7,91	(1)	386	729	(1)
	[200]	FB	17,99	18,50	20,51	12,09	9,29	7,99	2,64	10,00	(2)	2,95	11,22	9,57	17,99	639	1.288	26
	10"	RB	20,98	21,50	22,01	12,09	9,29	7,99	2,64	10,00	(2)	2,95	11,22	9,57	17,99	728	1.434	26
	[250]	FB	20,98	21,50	22,01	13,35	9,25	10,00	3,54	10,67	(2)	3,90	12,91	10,94	17,99	838	1.677	40
	12"	RB	24,02	24,49	25,00	13,35	9,25	10,00	3,54	10,67	(2)	3,90	12,91	10,94	17,99	970	1.886	40
	[300]	FB	24,02	24,49	25,00	15,94	11,02	12,01	4,84	13,23	(2)	4,96	15,04	13,07	17,99	1.279	2.566	71
	14"	RB	27,01	27,52	30,00	15,94	11,02	12,01	4,84	13,23	(2)	4,96	15,04	13,07	17,99	1.422	2.795	71
	[350]	FB	27,01	27,52	30,00	17,83	12,17	13,27	4,84	14,61	(2)	4,96	16,14	14,17	24,02	1.720	3.451	71
	16"	RB	30,00	30,51	32,99	17,83	12,17	13,27	4,84	14,61	(2)	4,96	16,14	14,17	24,02	1.940	3.854	71
	[400]	FB	30,00	30,51	32,99	19,33	13,58	15,24	4,84	16,02	(2)	4,96	17,64	15,67	30,00	2.271	4.583	75
	18"	RB	34,02	34,49	35,98	19,33	13,58	15,24	4,84	16,02	(2)	4,96	17,64	15,67	30,00	2.513	5.079	75
	[450]	FB	34,02	34,49	35,98	22,36	15,47	17,24	6,06	17,01	(2)	6,22	19,76	17,80	30,00	3.197	6.586	106
	20"	RB	35,98	36,50	39,02	22,36	15,47	17,24	6,06	17,01	(2)	6,22	19,76	17,80	30,00	3.439	6.994	106
	[500]	FB	35,98	36,50	39,02	24,02	17,05	19,25	2,36	21,18	(2)	6,10	22,05	19,45	30,00	3.968	8.161	150
	22"	RB	40,98	41,50	42,99	24,02	17,05	19,25	2,36	21,18	(2)	6,10	22,05	19,45	30,00	4.211	8.579	150
	[550]	FB	40,98	41,50	42,99	26,22	18,98	21,26	3,82	19,45	(2)	7,01	25,35	21,42	17,99	5.071	10.474	229
	24"	RB	42,01	42,52	45,00	26,22	18,98	21,26	3,82	19,45	(2)	7,01	25,35	21,42	17,99	5.512	11.329	229
	[600]	FB	42,01	42,52	45,00	27,76	20,51	23,27	3,82	19,61	(2)	7,01	26,69	22,95	17,99	6.217	12.151	229
	26"	RB	45,00	45,98	49,02	27,76	20,51	23,27	3,82	19,61	(2)	7,01	26,69	22,95	17,99	6.504	13.011	229
	[650]	FB	45,00	45,98	49,02	30,47	23,03	25,00	2,13	18,39	(2)	6,10	27,76	25,16	17,99	7.385	14.955	143
	28"	RB	49,02	50,00	52,99	30,47	23,03	25,00	2,13	18,39	(2)	6,10	27,76	25,16	17,99	7.804	15.689	143
	[700]	FB	49,02	50,00	52,99	32,01	24,57	27,01	2,13	21,18	(2)	6,10	29,29	26,69	30,00	9.326	19.043	148
	30"	RB	50,98	52,01	55,00	32,01	24,57	27,01	2,13	21,18	(2)	6,10	29,29	26,69	30,00	9.921	20.122	148
	[750]	FB	50,98	52,01	55,00	33,66	27,91	29,02	3,82	20,59	(2)	7,01	30,94	28,35	24,02	11.623	23.874	220
	32"	RB	54,02	55,12	60,00	33,66	27,91	29,02	3,70	20,59	(2)	7,01	30,94	28,35	24,02	12.125	24.472	220
	[800]	FB	54,02	55,12	60,00	35,43	28,74	30,75	9,33	21,65	(2)	9,13	33,07	30,31	14,37	13.558	27.631	395
	34"	RB	57,99	59,13	64,02	35,43	28,74	30,75	9,33	21,65	(2)	9,13	33,07	30,31	14,37	14.550	29.663	395
	[850]	FB	57,99	59,13	64,02	37,40	29,92	32,76	3,82	23,31	(2)	7,01	34,45	31,89	35,98	15.873	32.579	260
	36"	RB	60,00	61,10	67,99	37,40	29,92	32,76	3,82	23,31	(2)	7,01	34,45	31,89	35,98	16.976	34.484	260
	[900]	FB	60,00	61,10	67,99	38,35	31,38	34,49	9,33	22,91	(2)	9,13	35,83	33,07	17,99	18.210	37.206	401
	40"	RB	67,01	–	76,77	38,35	31,38	34,49	9,33	22,91	(2)	9,13	35,83	33,07	17,99	19.886	40.355	401
	[1000]	FB	67,01	–	76,77	41,73	34,06	38,50	9,33	24,29	(2)	9,13	38,58	35,83	24,02	23.611	48.569	401
	42"	RB	73,23	–	79,33	41,73	34,06	38,50	9,33	24,29	(2)	9,13	38,58	35,83	24,02	26.235	53.746	401
	[1050]	FB	73,23	–	79,33	43,70	35,83	40,24	9,33	24,29	(2)	9,13	40,55	37,80	24,02	27.778	57.148	401
	48"	RB	87,99	–	87,40	43,70	35,83	40,24	9,33	24,29	(2)	9,13	40,55	37,80	24,02	29.696	60.006	401
	[1200]	FB	87,99	–	87,40	50,39	40,16	45,98	9,33	25,71	(2)	9,13	46,06	43,31	30,00	37.258	76.677	406
	56"	RB	88,58	–	98,43	50,39	40,16	45,98	9,33	25,71	(2)	9,13	46,06	43,31	30,00	41.888	84.356	406
	[1400]	FB	88,58	–	98,43	54,72	45,28	53,74	14,02	40,47	(2)	14,02	51,89	47,24	24,02	45.889	93.178	1.574
	60"	RB	94,49	–	103,94	54,72	45,28	53,74	14,02	40,47	(2)	14,02	51,89	47,24	24,02	52.911	107.297	1.574
	[1500]	FB	94,49	–	103,94	60,83	50,39	57,52	14,02	41,89	(2)	14,02	55,83	51,18	30,00	59.999	122.923	1.579

Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.



Dimensions ANSI 300 – Full Bore 2" to 60" – Reduced Bore 3" to 60" – Models HRA, HPA and DB

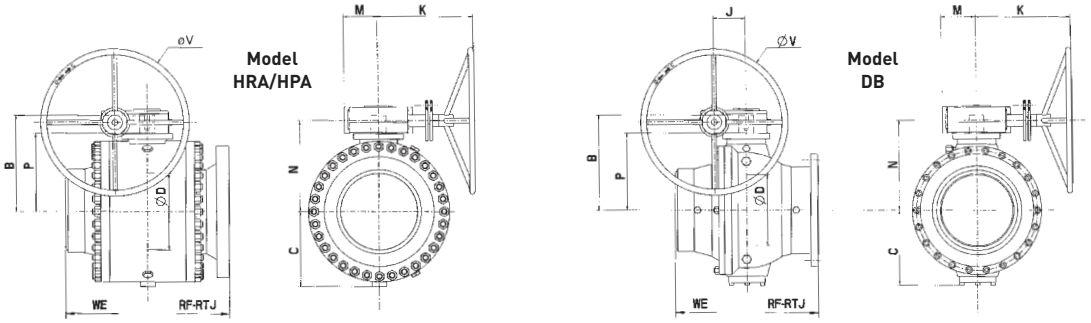
	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight lb. RF-RTJ	Weight lb. WE	Weight lb. Gear operator
ANSI 300	2" [50]	FB	8,50	9,13	8,50	5,04	3,43	2,01	(1)	(1)	14,57	(1)	6,38	4,06	(1)	49	35	(1)
	3"	RB	11,14	11,73	11,14	5,04	3,43	2,01	(1)	(1)	14,57	(1)	6,38	4,06	(1)	68	42	(1)
	[80]	FB	11,14	11,73	11,14	5,91	4,49	2,83	(1)	(1)	14,57	(1)	7,13	4,80	(1)	90	64	(1)
	4"	RB	12,01	12,64	12,01	5,91	4,49	2,83	(1)	(1)	14,57	(1)	7,13	4,80	(1)	119	75	(1)
	[100]	FB	12,01	12,64	12,01	7,24	5,04	4,02	(1)	(1)	19,69	(1)	7,17	5,91	(1)	143	99	(1)
	6"	RB	15,87	16,50	17,99	7,24	5,04	4,02	(1)	(1)	19,69	(1)	7,17	5,91	(1)	201	130	(1)
	[150]	FB	15,87	16,50	17,99	9,49	7,28	5,98	7,36	187,00	(2)	2,28	9,29	7,91	300	375	304	13
	8"	RB	19,76	20,39	20,51	9,49	7,28	5,98	7,36	187,00	(2)	2,28	9,29	7,91	300	465	357	13
	[200]	FB	19,76	20,39	20,51	12,09	9,29	7,99	11,38	289,00	(2)	2,95	11,22	9,57	610	683	575	26
	10"	RB	22,36	22,99	22,01	12,09	9,29	7,99	11,38	289,00	(2)	2,95	11,22	9,57	610	816	659	26
	[250]	FB	22,36	22,99	22,01	13,35	9,25	10,00	12,05	306,00	(2)	3,90	13,31	10,94	610	904	747	46
	12"	RB	25,51	26,14	25,00	13,35	9,25	10,00	12,05	306,00	(2)	3,90	13,31	10,94	610	1.058	836	46
	[300]	FB	25,51	26,14	25,00	15,94	11,02	12,01	16,02	407,00	(2)	4,96	15,43	13,07	762	1.455	1.232	110
	14"	RB	30,00	30,63	30,00	15,94	11,02	12,01	16,02	407,00	(2)	4,96	15,43	13,07	762	1.742	1.409	110
	[350]	FB	30,00	30,63	30,00	17,83	12,17	12,01	17,01	432,00	(2)	6,22	16,77	14,17	762	2.039	1.706	143
	16"	RB	32,99	33,62	32,99	17,83	12,17	12,01	17,01	432,00	(2)	6,22	16,77	14,17	762	2.238	1.858	143
	[400]	FB	32,99	33,62	32,99	19,33	13,58	15,24	21,18	538,00	(2)	5,67	18,27	15,67	762	2.668	2.288	150
	18"	RB	35,98	36,61	35,98	19,33	13,58	15,24	21,18	538,00	(2)	5,67	18,27	15,67	762	2.965	2.498	150
	[450]	FB	35,98	36,61	35,98	22,36	15,47	17,24	21,18	538,00	(2)	6,10	20,35	17,80	762	3.748	3.280	150
	20"	RB	39,02	39,76	39,02	22,36	15,47	17,24	21,18	538,00	(2)	6,10	20,35	17,80	762	4.189	3.618	150
	[500]	FB	39,02	39,76	39,02	24,02	17,05	19,25	18,39	467,00	(2)	6,10	22,01	19,45	457	4.674	4.103	245
	22"	RB	42,99	43,86	42,99	24,02	17,05	19,25	18,39	467,00	(2)	6,10	22,01	19,45	457	4.916	4.211	245
	[550]	FB	42,99	43,86	42,99	26,22	18,98	21,26	19,76	502,00	(2)	6,10	23,98	21,42	610	6.107	5.401	245
	24"	RB	45,00	45,87	45,00	26,22	18,98	21,26	19,76	502,00	(2)	6,10	23,98	21,42	610	6.305	5.459	245
	[600]	FB	45,00	45,87	45,00	27,76	20,51	23,27	22,20	564,00	(2)	7,01	25,71	22,95	457	7.143	6.296	419
	26"	RB	49,02	50,00	49,02	27,76	20,51	23,27	22,20	564,00	(2)	7,01	25,71	22,95	457	7.937	6.892	419
	[650]	FB	49,02	50,00	49,02	30,47	23,03	25,00	23,58	599,00	(2)	7,01	27,72	25,16	610	9.921	8.876	419
	28"	RB	52,99	54,02	52,99	30,47	23,03	25,00	23,58	599,00	(2)	7,01	27,72	25,16	610	10.582	9.310	419
	[700]	FB	52,99	54,02	52,99	32,01	26,61	27,01	23,58	599,00	(2)	7,01	31,26	26,69	610	11.299	10.027	419
	30"	RB	55,00	55,98	55,00	32,01	26,61	27,01	23,58	599,00	(2)	7,01	31,26	26,69	610	11.684	10.223	419
	[750]	FB	55,00	55,98	55,00	33,66	29,92	29,02	24,29	617,00	(2)	9,13	31,10	28,35	610	12.787	11.325	419
	32"	RB	60,00	61,14	60,00	33,66	29,92	29,02	24,29	617,00	(2)	9,13	31,10	28,35	610	13.889	12.181	419
	[800]	FB	60,00	61,14	60,00	35,43	31,10	30,75	24,29	617,00	(2)	9,13	33,07	30,31	610	15.432	13.724	419
	34"	RB	64,02	65,12	64,02	35,43	31,10	30,75	24,29	617,00	(2)	9,13	33,07	30,31	610	16.314	14.407	419
	[850]	FB	64,02	65,12	64,02	37,40	32,09	32,76	24,29	617,00	(2)	9,13	34,65	31,89	610	18.078	16.171	419
	36"	RB	67,99	69,13	67,99	37,40	32,09	32,76	24,29	617,00	(2)	9,13	34,65	31,89	610	18.960	16.821	419
	[900]	FB	67,99	69,13	67,99	38,35	32,48	34,49	25,71	653,00	(2)	9,13	35,83	33,07	762	20.283	18.144	419
	40"	RB	75,00	–	76,77	38,35	32,48	34,49	25,71	653,00	(2)	9,13	35,83	33,07	762	21.605	19.983	419
	[1000]	FB	75,00	–	76,77	41,73	36,42	38,50	27,13	689,00	(2)	9,13	38,58	35,83	914	26.037	24.414	432
	42"	RB	75,98	–	79,33	41,73	36,42	38,50	27,13	689,00	(2)	9,13	38,58	35,83	914	26.676	24.884	432
	[1050]	FB	75,98	–	79,33	43,70	38,19	40,24	28,43	722,00	(2)	11,14	41,06	37,80	457	30.424	28.631	619
	48"	RB	87,99	–	87,40	43,70	38,19	40,24	28,43	722,00	(2)	11,14	41,06	37,80	457	33.069	30.516	619
	[1200]	FB	87,99	–	87,40	50,39	41,81	45,98	28,43	722,00	(2)	11,14	46,57	43,31	457	39.463	36.910	611
	56"	RB	90,55	–	98,43	50,39	41,81	45,98	28,43	722,00	(2)	11,14	46,57	43,31	457	45.195	41.215	611
	[1400]	FB	90,55	–	98,43	54,72	47,64	53,74	41,89	1064,00	(2)	14,02	44,61	47,24	762	51.654	47.675	1.579
	60"	RB	94,49	–	103,94	54,72	47,64	53,74	41,89	1064,00	(2)	14,02	44,61	47,24	762	58.290	53.744	1.579
	[1500]	FB	94,49	–	103,94	60,83	52,76	57,52	42,95	1091,00	(2)	14,02	50,12	51,18	914	66.580	62.034	1.605

Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.



Dimensions ANSI 600 – Full Bore 2" to 60" – Reduced Bore 3" to 60" – Models HRA, HPA and DB

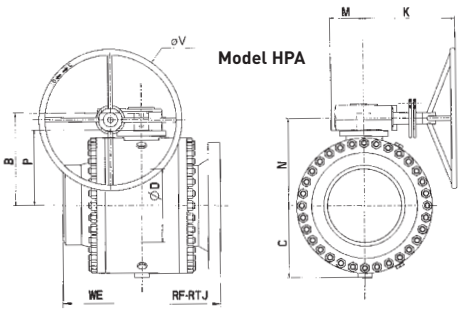
	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight lb. RF-RTJ	Weight lb. WE	Weight lb. Gear operator
ANSI 600	2" [50]	FB	11,50	11,61	11,50	6,30	3,43	2,01	(1)	(1)	14,57	(1)	6,38	4,06	(1)	55	40	(1)
	3"	RB	14,02	14,13	14,02	6,30	3,43	2,01	(1)	(1)	14,57	(1)	6,38	4,06	(1)	77	49	(1)
	[80]	FB	14,02	14,13	14,02	7,28	4,49	2,99	(1)	(1)	14,57	(1)	7,48	5,12	(1)	123	95	(1)
	4"	RB	17,01	17,13	17,01	7,28	4,49	2,99	(1)	(1)	14,57	(1)	7,48	5,12	(1)	168	106	(1)
	[100]	FB	17,01	17,13	17,01	7,68	5,75	4,02	(1)	(1)	35,43	(1)	7,76	6,38	(1)	243	181	(1)
	6"	RB	22,01	22,13	22,01	7,68	5,75	4,02	(1)	(1)	35,43	(1)	7,76	6,38	(1)	348	227	(1)
	[150]	FB	22,01	22,13	22,01	10,24	7,87	5,98	2,64	10,00	(2)	2,95	9,76	8,11	17,99	551	430	26
	8"	RB	25,98	26,14	25,98	10,24	7,87	5,98	2,64	10,00	(2)	2,95	9,76	8,11	17,99	683	498	26
	[200]	FB	25,98	26,14	25,98	12,32	9,72	7,99	3,54	12,05	(2)	3,90	11,77	9,80	24,02	948	763	42
	10"	RB	30,98	31,14	30,98	12,32	9,72	7,99	3,54	12,05	(2)	3,90	11,77	9,80	24,02	1.168	869	42
	[250]	FB	30,98	31,14	30,98	14,72	9,88	10,00	4,84	16,02	(2)	4,96	14,02	11,85	30,00	1.433	1.133	110
	12"	RB	32,99	33,11	32,99	14,72	9,88	10,00	4,84	16,02	(2)	4,96	14,02	11,85	30,00	1.565	1.213	110
	[300]	FB	32,99	33,11	32,99	17,20	11,57	12,01	2,13	19,76	(2)	5,67	15,75	13,54	24,02	2.061	1.709	150
	14"	RB	35,00	35,12	35,00	17,20	11,57	12,01	2,13	19,76	(2)	5,67	15,75	13,54	24,02	2.205	1.784	150
	[350]	FB	35,00	35,12	35,00	18,62	13,11	13,27	2,13	21,18	(2)	6,10	17,99	14,76	30,00	2.822	2.401	150
	16"	RB	39,02	39,13	39,02	18,62	13,11	13,27	2,13	21,18	(2)	6,10	17,99	14,76	30,00	3.329	2.736	150
	[400]	FB	39,02	39,13	39,02	21,18	14,41	15,24	5,43	23,58	(2)	6,10	20,59	16,61	24,02	3.660	3.067	256
	18"	RB	42,99	43,11	42,99	21,18	14,41	15,24	5,43	23,58	(2)	6,10	20,59	16,61	24,02	4.145	3.426	256
	[450]	FB	42,99	43,11	42,99	23,31	16,26	17,24	7,13	22,20	(2)	7,01	22,48	18,50	17,99	5.071	4.352	256
	20"	RB	47,01	47,24	47,01	23,31	16,26	17,24	7,13	22,20	(2)	7,01	22,48	18,50	17,99	5.776	4.872	256
	[500]	FB	47,01	47,24	47,01	25,43	18,35	19,25	7,13	23,58	(2)	7,01	25,04	20,63	24,02	6.614	5.710	419
	22"	RB	50,98	51,38	50,98	25,43	18,35	19,25	7,13	23,58	(2)	7,01	25,04	20,63	24,02	7.055	5.930	419
	[550]	FB	50,98	51,38	50,98	26,46	20,04	21,26	9,33	24,25	(2)	9,13	26,85	22,44	24,02	8.311	7.187	419
	24"	RB	55,00	55,39	55,00	26,46	20,04	21,26	9,33	24,25	(2)	9,13	26,85	22,44	24,02	8.863	7.520	419
	[600]	FB	55,00	55,39	55,00	29,76	21,93	23,27	9,33	24,45	(2)	9,13	28,31	23,90	24,02	10.141	8.799	419
	26"	RB	57,01	57,52	57,01	29,76	21,93	23,27	9,33	24,45	(2)	9,13	28,31	23,90	24,02	10.847	9.215	419
	[650]	FB	57,01	57,52	57,01	33,86	25,04	25,00	9,33	24,45	(2)	9,13	30,08	27,32	24,02	12.081	10.450	419
	28"	RB	60,98	61,50	60,98	33,86	25,04	25,00	9,33	24,45	(2)	9,13	30,08	27,32	24,02	12.699	10.886	419
	[700]	FB	60,98	61,50	60,98	35,43	26,61	27,01	9,33	27,13	(2)	9,13	31,65	28,90	17,99	14.584	12.771	434
	30"	RB	65,00	65,51	65,00	35,43	26,61	27,01	9,33	27,13	(2)	9,13	31,65	28,90	17,99	15.058	13.029	434
	[750]	FB	65,00	65,51	65,00	36,93	28,11	29,02	11,50	27,60	(2)	11,14	33,66	30,39	13,78	17.835	15.807	606
	32"	RB	70,00	70,63	70,00	36,93	28,11	29,02	11,50	27,60	(2)	11,14	33,66	30,39	13,78	18.078	15.807	606
	[800]	FB	70,00	70,63	70,00	38,27	29,45	30,75	11,50	28,62	(2)	11,14	35,00	31,73	17,99	19.643	17.372	611
	34"	RB	75,98	76,61	75,98	38,27	29,45	30,75	11,50	28,62	(2)	11,14	35,00	31,73	17,99	22.024	19.553	611
	[850]	FB	75,98	76,61	75,98	40,31	30,91	32,76	11,50	30,00	(2)	11,14	36,26	32,99	24,02	24.471	22.000	613
	36"	RB	82,01	82,64	82,01	40,31	30,91	32,76	11,50	30,00	(2)	11,14	36,26	32,99	24,02	26.235	23.422	613
	[900]	FB	82,01	82,64	82,01	41,65	32,24	34,49	11,50	30,00	(2)	11,14	37,60	34,33	24,02	28.660	25.847	613
	40"	RB	92,01	–	76,77	41,65	32,24	34,49	11,50	30,00	(2)	11,14	37,60	34,33	24,02	30.644	27.752	613
	[1000]	FB	92,01	–	76,77	47,24	37,20	38,50	11,50	31,22	(2)	11,14	41,06	37,01	30,00	36.553	33.660	615
	42"	RB	93,98	–	79,33	47,24	37,20	38,50	11,50	31,22	(2)	11,14	41,06	37,01	30,00	39.683	36.028	615
	[1050]	FB	93,98	–	79,33	48,43	39,37	40,24	14,02	40,47	(2)	14,02	43,62	38,98	24,02	43.211	39.555	1.574
	48"	RB	105,00	–	87,40	48,43	39,37	40,24	14,02	40,47	(2)	14,02	43,62	38,98	24,02	46.650	41.493	1.574
	[1200]	FB	105,00	–	87,40	53,15	43,31	45,98	14,02	41,89	(2)	14,02	49,13	44,49	30,00	56.041	50.885	1.579
	56"	RB	105,00	–	98,43	53,15	43,31	45,98	14,02	41,89	(2)	14,02	49,13	44,49	30,00	57.585	49.681	1.579
	[1400]	FB	105,00	–	98,43	57,48	50,39	53,74	17,40	46,54	(2)	17,72	54,33	48,43	30,00	69.203	61.299	2.571
	60"	RB	116,14	–	103,94	57,48	50,39	53,74	17,40	46,54	(2)	17,72	54,33	48,43	30,00	82.365	72.197	2.571
	[1500]	FB	116,14	–	103,94	63,78	57,09	57,52	21,14	49,57	(2)	21,65	59,45	52,36	35,98	88.030	77.863	3.810

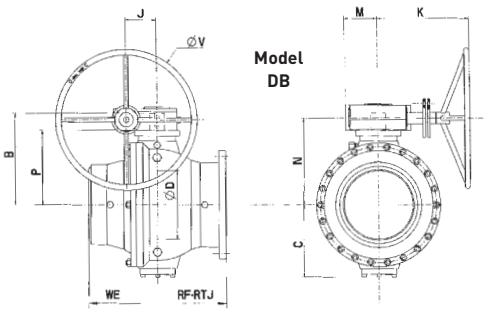
Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.





Dimensions ANSI 900 – Full Bore 2" to 60" – Reduced Bore 3" to 60" – Models HPA and DB

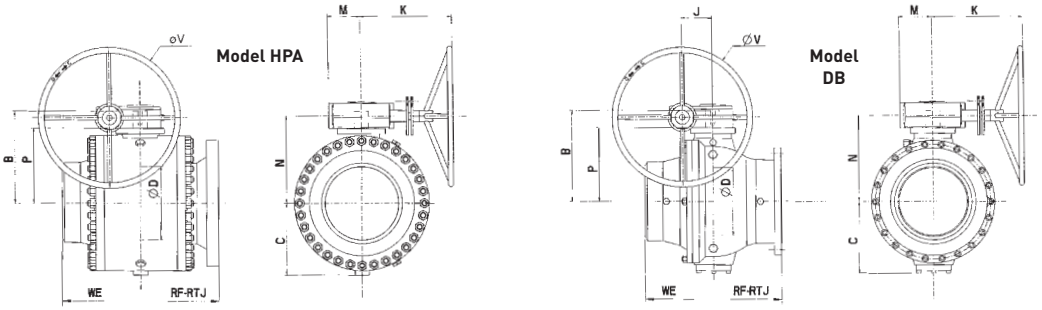
	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight (lb) RF-RTJ	Weight (lb) WE	Weight (lb) Gear operator
ANSI 900	2" [50]	FB	14,49	14,61	14,49	4,76	3,98	2,01	(1)	(1)	14,57	(1)	6,02	3,43	(1)	128	88	(1)
	3"	RB	15,00	15,12	15,00	4,76	3,98	2,01	(1)	(1)	14,57	(1)	6,02	3,43	(1)	139	90	(1)
	[80]	FB	15,00	15,12	15,00	7,36	5,24	2,99	(1)	(1)	35,43	(1)	7,17	5,79	(1)	203	154	(1)
	4"	RB	17,99	18,11	17,99	7,36	5,24	2,99	(1)	(1)	35,43	(1)	7,17	5,79	(1)	251	170	(1)
	[100]	FB	17,99	18,11	17,99	9,72	5,91	4,02	2,05	6,85	(2)	2,28	7,95	6,57	9,84	309	227	13
	6"	RB	24,02	24,13	24,02	9,72	5,91	4,02	2,05	6,85	(2)	2,28	7,95	6,57	9,84	463	298	13
	[150]	FB	24,02	24,13	24,02	10,24	8,03	5,98	3,54	12,05	(2)	3,90	10,35	8,39	24,02	705	540	42
	8"	RB	29,02	29,13	29,02	10,24	8,03	5,98	3,54	12,05	(2)	3,90	10,35	8,39	24,02	904	624	42
	[200]	FB	29,02	29,13	29,02	12,80	10,04	7,99	4,84	16,02	(2)	4,96	12,24	10,28	30,00	1.323	1.043	75
	10"	RB	32,99	33,11	32,99	12,80	10,04	7,99	4,84	16,02	(2)	4,96	12,24	10,28	30,00	1.565	1.166	75
	[250]	FB	32,99	33,11	32,99	15,75	12,05	10,00	2,13	19,76	(2)	5,67	14,49	12,36	24,02	2.006	1.607	143
	12"	RB	37,99	38,11	37,99	15,75	12,05	10,00	2,13	19,76	(2)	5,67	14,49	12,36	24,02	2.293	1.755	143
	[300]	FB	37,99	38,11	37,99	17,91	14,21	12,01	2,13	19,76	(2)	6,10	17,13	14,53	24,02	2.866	2.328	150
	14"	RB	40,51	40,87	40,51	17,91	14,21	12,01	2,13	19,76	(2)	6,10	17,13	14,53	24,02	3.064	2.429	150
	[350]	FB	40,51	40,87	40,51	20,31	15,71	12,76	7,13	22,20	(2)	7,01	18,58	16,02	17,99	3.527	2.892	258
	16"	RB	44,49	44,88	44,49	20,31	15,71	12,76	7,13	22,20	(2)	7,01	18,58	16,02	17,99	3.858	3.093	258
	[400]	FB	44,49	44,88	44,49	22,76	16,18	14,76	11,50	28,62	(2)	11,14	21,54	18,27	17,99	4.982	4.217	258
	18"	RB	47,99	48,50	47,99	22,76	16,18	14,76	11,50	28,62	(2)	11,14	21,54	18,27	17,99	5.622	4.553	258
	[450]	FB	47,99	48,50	47,99	25,04	17,72	16,73	9,33	23,07	(2)	9,13	22,48	19,72	17,99	7.055	5.986	258
	20"	RB	52,01	52,52	52,01	25,04	17,72	16,73	9,33	23,07	(2)	9,13	22,48	19,72	17,99	7.760	6.433	258
	[500]	FB	52,01	52,52	52,01	26,54	19,21	18,62	9,33	25,87	(2)	9,13	23,98	21,22	30,00	8.267	6.940	419
	22"	RB	55,98	56,50	55,98	26,54	19,21	18,62	9,33	25,87	(2)	9,13	23,98	21,22	30,00	9.039	7.099	419
	[550]	FB	55,98	56,50	55,98	31,50	22,44	20,63	9,33	26,42	(2)	9,13	28,46	25,20	35,98	11.574	9.634	419
	24"	RB	60,98	61,73	60,98	31,50	22,44	20,63	9,33	26,42	(2)	9,13	28,46	25,20	35,98	12.125	9.588	419
	[600]	FB	60,98	61,73	60,98	32,64	24,13	22,52	11,50	28,62	(2)	11,14	29,49	26,22	17,99	14.793	12.255	628
	26"	RB	63,98	64,84	63,98	32,64	24,13	22,52	11,50	28,62	(2)	11,14	29,49	26,22	17,99	16.314	13.702	628
	[650]	FB	63,98	64,84	63,98	35,04	26,18	24,37	11,50	28,43	(2)	11,14	31,73	28,54	17,99	17.394	14.782	628
	28"	RB	67,99	68,86	67,99	35,04	26,18	24,37	11,50	28,43	(2)	11,14	31,73	28,54	17,99	17.725	14.645	628
	[700]	FB	67,99	68,86	67,99	37,01	28,35	26,26	11,50	29,80	(2)	11,14	35,04	31,69	24,02	20.723	17.644	628
	30"	RB	70,98	71,85	70,98	37,01	28,35	26,26	11,50	29,80	(2)	11,14	35,04	31,69	24,02	21.275	17.696	628
	[750]	FB	70,98	71,85	70,98	38,98	30,71	28,11	11,50	29,80	(2)	11,14	40,16	37,20	24,02	24.163	20.585	628
	32"	RB	75,00	75,87	75,00	38,98	30,71	28,11	11,50	29,80	(2)	11,14	40,16	37,20	24,02	25.221	20.913	628
	[800]	FB	75,00	75,87	75,00	40,94	32,28	30,00	11,50	31,22	(2)	11,14	40,94	37,80	30,00	29.983	25.675	628
	34"	RB	80,00	81,10	80,00	40,94	32,28	30,00	11,50	31,22	(2)	11,14	40,94	37,80	30,00	31.085	26.037	628
	[850]	FB	80,00	81,10	80,00	42,32	33,86	31,89	14,02	40,47	(2)	14,02	43,70	39,17	24,02	33.797	28.748	1.574
	36"	RB	85,91	87,13	85,91	42,32	33,86	31,89	14,02	40,47	(2)	14,02	43,70	39,17	24,02	35.450	29.727	1.574
	[900]	FB	85,91	87,13	85,91	44,09	36,93	33,74	14,02	41,89	(2)	14,02	44,49	40,16	30,00	39.022	33.299	1.579
	40"	RB	94,88	95,98	94,88	44,09	36,93	33,74	14,02	41,89	(2)	14,02	44,49	40,16	30,00	40.345	34.136	1.579
	[1000]	FB	94,88	95,98	94,88	47,24	39,37	37,76	14,02	43,35	(2)	14,02	45,67	41,34	35,98	48.502	42.293	1.605
	42"	RB	99,02	100,00	99,02	47,24	39,37	37,76	14,02	43,35	(2)	14,02	45,67	41,34	35,98	50.927	44.033	1.605
	[1050]	FB	99,02	100,00	99,02	52,17	42,52	39,49	14,02	41,89	(2)	14,02	47,24	42,91	30,00	57.320	50.426	1.579
	48"	RB	103,15	112,20	94,49	52,17	42,52	39,49	14,02	41,89	(2)	14,02	47,24	42,91	30,00	65.499	55.475	1.579
	[1200]	FB	103,15	112,20	94,49	56,10	47,24	45,47	14,02	42,95	(2)	14,02	52,36	48,03	35,98	72.312	62.287	1.605
	56"	RB	111,02	–	98,43	56,10	47,24	45,47	14,02	42,95	(2)	14,02	52,36	48,03	35,98	79.587	66.028	1.605
	[1400]	FB	111,02	–	98,43	60,63	53,54	52,64	25,71	51,65	(2)	26,38	60,83	52,36	30,00	92.087	78.529	5.106
	60"	RB	115,35	–	102,36	60,63	53,54	52,64	25,71	51,65	(2)	26,38	60,83	52,36	30,00	111.929	92.307	5.106
	[1500]	FB	115,35	–	102,36	69,88	63,98	56,61	25,71	52,72	(2)	26,38	64,57	56,10	35,98	116.580	96.959	5.132

Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.



Dimensions ANSI 1500 – Full Bore 2" to 60" – Reduced Bore 3" to 60" – Models HPA and DB

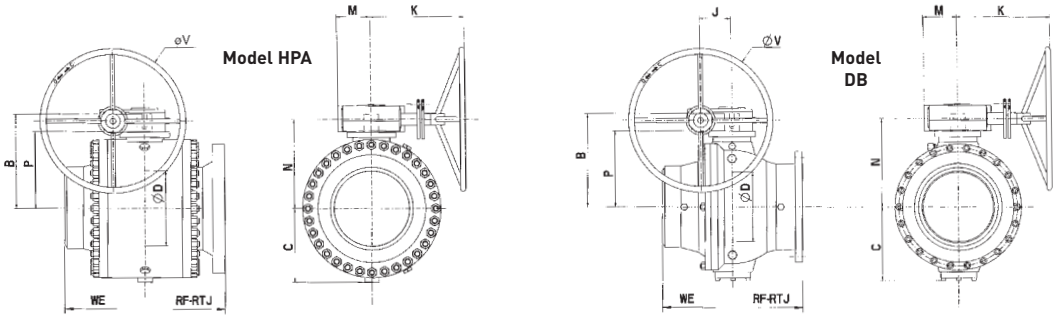
	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight lb. RF-RTJ	Weight lb. WE	Weight lb. Gear operator
ANSI 1500	2" [50]	FB	14,49	14,61	14,49	6,06	3,74	2,01	(1)	(1)	19,69	(1)	6,50	4,72	(1)	128	88	(1)
	3"	RB	18,50	18,62	18,50	6,06	3,74	2,01	(1)	(1)	19,69	(1)	6,50	4,72	(1)	172	97	(1)
	[80]	FB	18,50	18,62	18,50	7,36	5,00	2,99	2,05	6,85	(2)	2,28	7,17	5,79	9,84	243	168	13
	4"	RB	21,50	21,61	21,50	7,36	5,00	2,99	2,05	6,85	(2)	2,28	7,17	5,79	9,84	298	185	13
	[100]	FB	21,50	21,61	21,50	8,54	6,22	4,02	2,64	8,98	(2)	2,95	8,23	6,57	13,78	419	306	24
	6"	RB	27,76	27,99	27,76	8,54	6,22	4,02	2,64	8,98	(2)	2,95	8,23	6,57	13,78	639	379	24
	[150]	FB	27,76	27,99	27,76	11,18	8,74	5,75	4,84	14,61	(2)	4,96	11,30	9,33	24,02	1.102	842	71
	8"	RB	32,76	33,11	32,76	11,18	8,74	5,75	4,84	14,61	(2)	4,96	11,30	9,33	24,02	1.367	939	71
	[200]	FB	32,76	33,11	32,76	13,54	9,72	7,64	6,06	17,01	(2)	6,22	13,07	11,10	30,00	1.786	1.358	134
	10"	RB	39,02	39,37	39,02	13,54	9,72	7,64	6,06	17,01	(2)	6,22	13,07	11,10	30,00	2.271	1.532	134
	[250]	FB	39,02	39,37	39,02	17,80	12,32	9,49	2,13	21,18	(2)	6,10	16,77	14,17	30,00	3.086	2.348	148
	12"	RB	44,49	45,12	44,49	17,80	12,32	9,49	2,13	21,18	(2)	6,10	16,77	14,17	30,00	3.704	2.617	148
	[300]	FB	44,49	45,12	44,49	20,16	13,90	11,38	3,82	22,44	(2)	7,01	18,43	15,87	30,00	4.740	3.653	265
	14"	RB	49,49	50,24	49,49	20,16	13,90	11,38	3,82	22,44	(2)	7,01	18,43	15,87	30,00	5.401	3.946	265
	[350]	FB	49,49	50,24	49,49	22,09	14,96	12,52	9,33	24,45	(2)	9,13	19,53	16,77	24,02	6.878	5.423	265
	16"	RB	54,49	55,39	54,49	22,09	14,96	12,52	9,33	24,45	(2)	9,13	19,53	16,77	24,02	8.113	6.210	401
	[400]	FB	54,49	55,39	54,49	23,66	16,54	14,25	9,33	25,87	(2)	9,13	21,10	18,35	30,00	9.833	7.930	408
	18"	RB	60,51	61,38	60,51	23,66	16,54	14,25	9,33	25,87	(2)	9,13	21,10	18,35	30,00	10.626	7.930	408
	[450]	FB	60,51	61,38	60,51	30,16	22,05	14,61	11,50	27,60	(2)	11,14	27,09	23,82	13,78	12.897	10.201	408
	20"	RB	65,51	66,38	65,51	30,16	22,05	14,61	11,50	27,60	(2)	11,14	27,09	23,82	13,78	14.639	11.283	408
	[500]	FB	65,51	66,38	65,51	31,69	23,58	16,38	11,50	28,62	(2)	11,14	28,62	25,35	17,99	17.196	13.841	611
	22"	RB	70,91	72,01	70,91	31,69	23,58	16,38	11,50	28,62	(2)	11,14	28,62	25,35	17,99	18.409	14.220	611
	[550]	FB	70,91	72,01	70,91	33,07	25,98	17,99	11,50	29,80	(2)	11,14	30,04	26,77	24,02	21.076	16.887	611
	24"	RB	76,50	77,64	76,50	33,07	25,98	17,99	11,50	29,80	(2)	11,14	30,04	26,77	24,02	24.471	19.055	611
	[600]	FB	76,50	77,64	76,50	33,90	26,57	19,61	11,50	30,00	(2)	11,14	31,61	28,35	24,02	26.632	21.215	611
	26"	RB	80,63	81,77	80,63	33,90	26,57	19,61	11,50	30,00	(2)	11,14	31,61	28,35	24,02	28.881	22.774	611
	[650]	FB	80,63	81,77	80,63	36,61	29,92	21,26	11,50	31,22	(2)	11,14	33,58	30,31	30,00	30.644	24.537	615
	28"	RB	84,57	85,67	84,57	36,61	29,92	21,26	11,50	31,22	(2)	11,14	33,58	30,31	30,00	31.526	22.972	615
	[700]	FB	84,57	85,67	84,57	38,58	33,39	22,99	14,02	40,47	(2)	14,02	36,93	32,28	24,02	34.392	25.838	1.574
	30"	RB	88,62	89,80	88,62	38,58	33,39	22,99	14,02	40,47	(2)	14,02	36,93	32,28	24,02	37.919	27.161	1.574
	[750]	FB	88,62	89,80	88,62	46,85	36,81	24,61	14,02	41,89	(2)	14,02	42,13	37,40	30,00	41.337	30.578	1.579
	32"	RB	92,36	93,70	92,36	46,85	36,81	24,61	14,02	41,89	(2)	14,02	42,13	37,40	30,00	51.037	38.393	1.579
	[800]	FB	92,36	93,70	92,36	53,03	39,37	26,38	14,02	43,35	(2)	14,02	47,24	42,60	35,98	55.116	42.472	1.605
	34"	RB	96,46	96,61	96,46	53,03	39,37	26,38	14,02	43,35	(2)	14,02	47,24	42,60	35,98	59.216	44.555	1.605
	[850]	FB	96,46	96,61	96,46	59,06	41,93	28,35	14,02	41,89	(2)	14,02	51,57	46,85	30,00	67.682	53.021	1.579
	36"	RB	100,63	101,97	100,63	59,06	41,93	28,35	14,02	41,89	(2)	14,02	51,57	46,85	30,00	71.121	53.815	1.579
	[900]	FB	100,63	101,97	100,63	66,14	44,88	30,00	14,02	42,95	(2)	14,02	56,69	51,97	35,98	82.894	65.587	1.605
	40"	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[1000]	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	42"	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[1050]	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.



Dimensions ANSI 2500 – Full Bore 2" to 30" – Reduced Bore 3" to 30" – Models HPA and DB

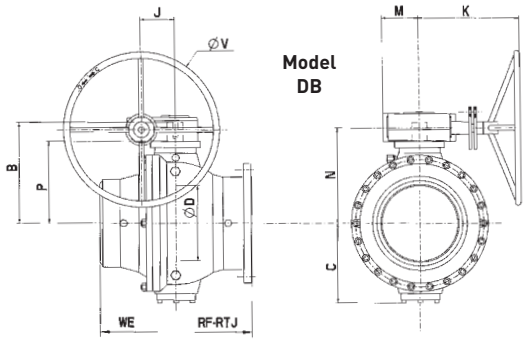
	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight (lb) RF-RTJ	Weight (lb) WE	Weight (lb) Gear operator
ANSI 2500	2" [50]	FB	17,76	17,87	17,76	6,85	4,72	1,73	(1)	(1)	35,43	(1)	7,01	5,63	(1)	50	37	(1)
	3"	RB	22,76	22,99	22,76	6,85	4,72	1,73	(1)	(1)	35,43	(1)	7,24	5,63	(1)	70	41	(1)
	[80]	FB	22,76	22,99	22,76	8,82	5,87	2,52	2,64	10,00	(2)	2,95	8,11	6,46	17,99	100	70	5
	4"	RB	26,50	26,89	26,50	8,82	5,87	2,52	2,64	10,00	(2)	2,95	8,11	6,46	17,99	118	73	5
	[100]	FB	26,50	26,89	26,50	10,55	7,09	3,50	3,54	12,05	(2)	3,90	10,16	8,19	24,02	168	123	9
	6"	RB	35,98	36,50	35,98	10,55	7,09	3,50	3,54	12,05	(2)	3,90	10,16	8,19	24,02	261	145	9
	[150]	FB	35,98	36,50	35,98	14,61	10,83	5,24	6,06	17,01	(2)	6,22	13,43	11,46	30,00	431	315	30
	8"	RB	40,24	40,87	40,24	14,61	10,83	5,24	6,06	17,01	(2)	6,22	13,43	11,46	30,00	508	339	30
	[200]	FB	40,24	40,87	40,24	17,56	13,19	7,13	2,13	21,18	(2)	6,10	16,54	13,94	30,00	689	521	30
	10"	RB	50,00	50,87	50,00	17,56	13,19	7,13	2,13	21,18	(2)	6,10	16,54	13,94	30,00	903	581	30
	[250]	FB	50,00	50,87	50,00	22,44	17,01	8,86	9,33	23,07	(2)	9,13	21,26	18,50	17,99	1.315	993	83
	12"	RB	55,98	56,89	55,98	22,44	17,01	8,86	9,33	23,07	(2)	9,13	21,26	18,50	17,99	1.520	1.062	83
	[300]	FB	55,98	56,89	55,98	27,48	20,67	10,51	9,33	24,45	(2)	9,13	25,12	22,36	24,02	2.114	1.656	83
	14"	RB	60,63	61,77	60,63	27,48	20,67	10,51	9,33	24,45	(2)	9,13	25,12	22,36	24,02	2.141	1.542	83
	[350]	FB	60,63	61,77	60,63	29,25	21,65	9,49	9,33	25,87	(2)	9,13	26,10	23,35	30,00	2.200	1.601	83
	16"	RB	61,69	62,83	61,69	29,25	21,65	9,49	9,33	25,87	(2)	9,13	26,10	23,35	30,00	2.313	1.374	83
	[400]	FB	61,69	62,83	61,69	33,50	25,43	10,87	11,50	28,62	(2)	11,14	30,08	26,81	17,99	3.529	2.590	126
	18"	RB	71,85	72,99	71,85	33,50	25,43	10,87	11,50	28,62	(2)	11,14	30,08	26,81	17,99	4.037	2.799	126
	[450]	FB	71,85	72,99	71,85	36,38	28,70	12,24	11,50	30,00	(2)	11,14	33,35	30,08	24,02	4.563	3.325	324
	20"	RB	73,82	74,96	73,82	36,38	28,70	12,24	11,50	30,00	(2)	11,14	33,35	30,08	24,02	5.216	3.606	324
	[500]	FB	73,82	74,96	73,82	40,28	30,12	13,50	11,50	31,42	(2)	11,14	34,13	30,87	30,00	6.151	4.540	325
	22"	RB	80,91	82,13	80,91	40,28	30,12	13,50	11,50	31,42	(2)	11,14	34,13	30,87	30,00	6.713	4.595	325
	[550]	FB	80,91	82,13	80,91	44,49	33,07	14,88	14,02	40,47	(2)	14,02	38,58	33,86	24,02	7.648	5.529	324
	24"	RB	88,86	90,00	88,86	44,49	33,07	14,88	14,02	40,47	(2)	14,02	38,58	33,86	24,02	8.187	5.443	324
	[600]	FB	88,86	90,00	88,86	49,21	36,22	16,26	14,02	42,09	(2)	14,02	41,73	37,01	30,00	9.435	6.690	325
	26"	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[650]	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	28"	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[700]	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	30"	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[750]	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.



Dimensions API 10,000 – Full Bore 1 13/16" to 21 1/4" – Reduced Bore 2 1/16" to 21 1/4" – Model DB

	Nominal Diameter in. [mm]		RF	RJ	WE	B	C	D	J	K	L(3)	M	N	P	V	Weight (lb) RF-RTJ	Weight (lb) WE	Weight (lb) Gear operator
API 10.000	1 13/16" [46]	FB	–	18,23	18,23	7,09	5,71	1,81	(1)	(1)	35,43	(1)	6,89	5,71	(1)	154	121	(1)
	2 1/16"	RB	–	20,51	20,51	7,09	5,71	1,81	(1)	(1)	35,43	(1)	6,89	5,71	(1)	176	137	(1)
	[52]	FB	–	20,51	20,51	7,09	5,71	2,05	2,64	8,62	(2)	2,95	7,36	5,71	12,01	220	181	22
	2 9/16"	RB	–	22,24	22,24	7,09	5,71	2,05	2,64	8,62	(2)	2,95	7,36	5,71	12,01	287	225	22
	[65]	FB	–	22,24	22,24	9,65	6,97	2,56	3,54	10,98	(2)	3,90	8,94	6,97	17,99	397	335	71
	3 1/16"	RB	–	24,37	24,37	9,65	6,97	2,56	3,54	10,98	(2)	3,90	8,94	6,97	21,54	507	412	71
	[78]	FB	–	24,37	24,37	9,65	7,95	3,07	3,54	12,36	(2)	3,90	10,67	8,70	24,02	661	567	71
	4 1/16"	RB	–	26,38	26,38	11,18	7,95	3,07	3,54	12,36	(2)	3,90	10,67	8,70	24,02	816	661	71
	[103]	FB	–	26,38	26,38	14,09	9,25	4,06	4,84	17,60	(2)	4,96	12,13	10,16	35,98	1.146	992	99
	5 1/8"	RB	–	29,02	29,02	14,09	9,25	4,06	4,84	17,60	(2)	4,96	12,13	10,16	35,98	1.852	1.636	99
	[130]	FB	–	29,02	29,02	14,84	11,22	5,12	2,36	20,98	(2)	6,10	15,35	11,42	30,00	2.315	2.099	152
	7 1/16"	RB	–	40,94	40,94	14,84	11,22	5,12	2,36	20,98	(2)	6,10	15,35	11,42	30,00	3.748	3.250	152
	[179]	FB	–	40,94	40,94	20,28	16,50	7,05	9,33	24,29	(2)	9,13	19,17	16,42	24,02	4.740	4.242	401
	9"	RB	–	47,24	47,24	20,12	16,14	7,05	9,33	24,29	(2)	9,13	19,17	16,42	24,02	5.512	4.744	401
	[228]	FB	–	47,24	47,24	26,38	20,87	8,98	11,50	28,43	(2)	11,14	24,45	21,18	17,99	9.811	9.043	611
	11"	RB	–	55,98	55,98	26,38	20,87	8,98	11,50	28,43	(2)	11,14	24,45	209,76	17,99	10.318	9.109	611
	[279]	FB	–	55,98	55,98	32,28	25,59	10,98	11,50	31,22	(2)	11,14	29,53	25,98	30,00	17.946	16.737	615
	13 6/8"	RB	–	62,83	62,83	32,28	25,59	10,98	11,50	31,22	(2)	11,14	29,53	25,98	30,00	18.916	16.989	615
	[346]	FB	–	62,83	62,83	40,16	31,89	13,62	14,57	38,78	(2)	14,17	37,01	32,28	30,00	34.238	32.311	1.587
	16 3/4"	RB	–	70,00	70,00	40,16	31,89	13,62	14,57	38,78	(2)	14,17	37,01	32,28	30,00	35.715	32.538	1.587
	[425]	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	18 3/4"	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[476]	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	21 1/4"	RB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	[540]	FB	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Standards do not exist for these dimensions - Contact your sales representative.

(1) Lever operated valves
(2) Gear operated valves
(3) "L" dimension not shown on sketches is lever length dimension

RB = Reduced Bore
FB = Full Bore

All measurements and weights are representative of typical model designation; however, actual may vary depending on selection of model, base material, cast or forged design and end connections. Please contact your local sales representative for further clarification.

Reduced bore dimensions conform to API 6D Section 6.2.2

Valves DN 300 (NPS 12) and below: one size below nominal size of valve

Valves DN 350 (NPS 14) to DN 600 (NPS 24): two sizes below nominal size of valve

Valves above DN 600 (NPS 24): by agreement

Note:

The "reduced bore dimensions" table specifies the corresponding bore sizes within the dimensional tables. More important bore reductions are supplied as standard or special designs.

