



**SPLIT BODY
TRUNNION
BALL
VALVE**

You Solution Partner
1978 - ∞



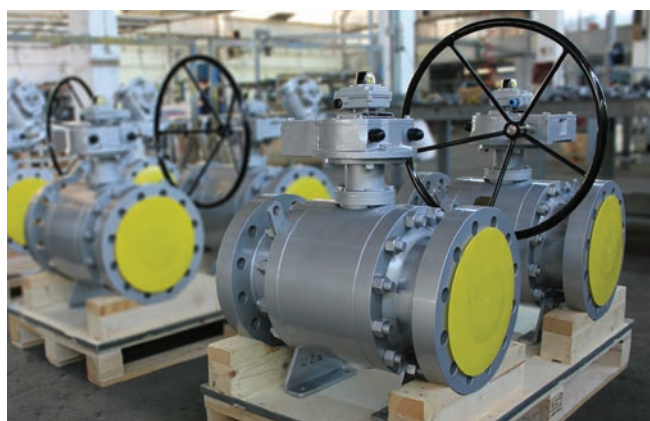
Batusan, with the trademark BatuValve started manufacturing Ball Valves in 1978. Since then, continues to serve the industry with dedication to quality, product innovation and commitment to customer service. We manufacture all our products %100 in our production facility in Turkey. We use European originated raw materials. Our trust in our products allows us to provide 2 year unlimited warranty.

Our main product line is Ball Valves. We also produce Check valves, Strainers and Flow Indicators. Being a leader manufacturer in Turkey for 43 years. Apart from the Turkish industry, we export our products with pride to Germany, Bulgaria, Serbia, Poland, Croatia, Bosnia-Herzegovina, Greece, Lebanon, Saudi Arabia, Russia, Iran, Egypt, Yemen, Afghanistan, Austria, Vietnam, Equador, Colombia, Brasil, Ukraine, France, Algeria, Morocco, Tunisia, Gabon and so on. We also produce OEM products for some of the most known global brands from Italy, Germany, Austria, etc.

Our products have been installed throughout the world, handling a wide variety of applications in the Gas, Oil, Refining, Chemical, Food, Power Generation and Pipeline Transmission industries.

We have been emphasizing R&D department and always expanding our product line serving the needs of our customers. We have most of the Industrial valve manufacturing certificates, including;

ISO 9001: 2015, API 6D "0695", TSE, TS 9809, TSE EN 331, TSE 3148, TSE TS 16767, TSE TS 11494, TOV SOD CE 0036, TOV IT 18 ATEX 056 AR, TA LUFT, EN 14432, API 6FA FIRE SAFE, API 607, FIRE SAFE, ISO 10497 FIRE SAFE, EAC-1, EAC-2, ROS TEKHNAZDOR, TH 02, HYGIENE, GAS, GAZMER, EGAS, BELARUS



SPLIT BODY TRUNION BALL VALVE SPECIFICATIONS

Batu API 6D trunion ball valves are designed to include many features for you as a result of a detailed R&D study. Extra options are available upon request.

LOW TORQUE BALL VALVES

ANTI-BLOWOUT STEM DESIGN

ANTI STATIC DEVICE

ISO 5211 MOUNTING FLANGE

LOW EMISSION VALVES

DOUBLE BLOCK & BLEED

- * DBB
- * DIB-1
- * DIB-2

EMERGENCY SEALANT INJECTION

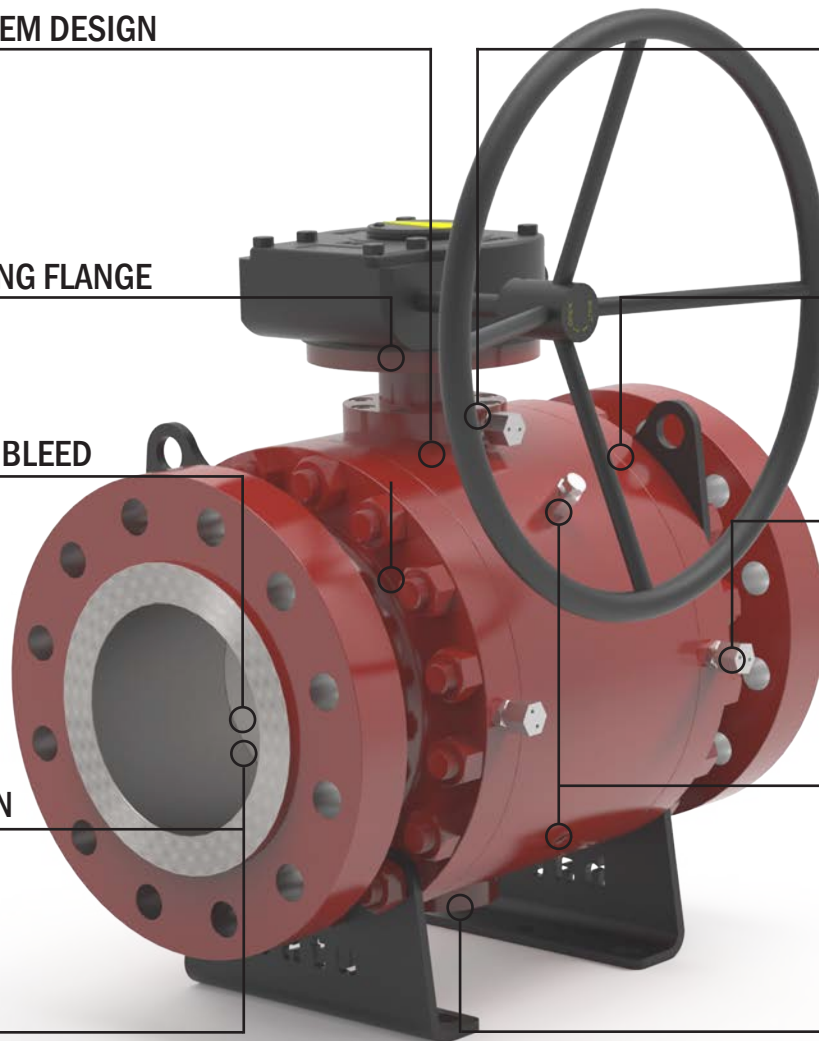
FIRE-SAFE DESIGN

BODY DRAIN AND VENT

SEAT

- * Single Piston Effect (SPE)
- * Double Piston Effect (DPE)

TRUNNION BALL



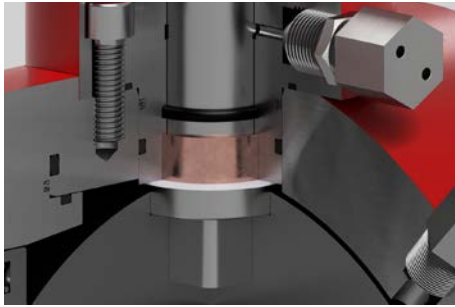
FEATURES	
DIMENSIONS	1/2" - 56"
CONNECTIONS TYPES	RF / RTJ / BW / SW
WORKING PRESSURE	ANSI 150 - 2500
WORKING TEMPERATURE	-46 °C - .+210 °C
OPERATION	LEVER / GEAR BOX / ACTUATOR

STANDARDS	
DESING	API 6D & ASME B16.34 & EN ISO 17292
DIMENSIONS	API 6D & ASME B16.10
CONNECTIONS	ASME B16.5 & ASME B16.47 Series A
FIRE-SAFE	API 6FA & API 607 & ISO 10497
TESTING	API 6D & API 598

TECHNICAL SPECIFICATIONS

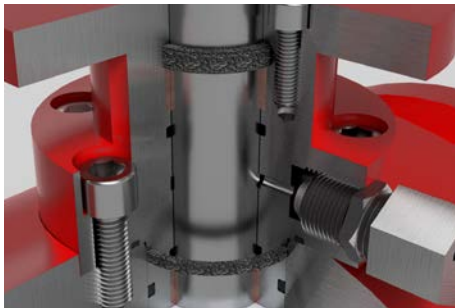
FEATURE	
Trunnion Ball	Standard
Anti-Blowout Stem Design	Standard
Anti Statik Device	Standard
Fire Safe Design	Standard
ISO 5211 Mounting Flange	Standard
ASME B16.5 & ASME B16.47 Series A	Standard
Soft Seat Design	Standard
Primary Metal Secondary Soft Seat Design	On Request
Metal to Metal Seat Design	On Request
Single Piston Effect (SPE)	Standard
Double Piston Effect (DPE)	On Request
Single/ Double Piston Effect Combination	On Request
Double Block and Bleed Design (DBB)	Standard
Double Isolation and Bleed (DIB 1) Design	On Request
Double Isolation and Bleed (DIB 2) Design	On Request
Drain	Standard
Drain Valve or Check Valve	On Request
Vent (on 6" and larger)	Standard
Vent Valve	On Request
Raised Face Flange	Standard
Ring Joint Flange	Standard
Buttweld Flange	On Request
Socket Flange	On Request
Bennet Injection (on 6" and larger)	Standard
Seat Injection (on 6" and larger)	Standard
Lever	Standard
Lever Lock System	On Request
Gear Box	On Request
Gear Box Lock System	On Request
Mapa and Support (on 6" and larger)	Standard
Valve Open/Close Indicator	Standard

ANTI-BLOWOUT STEM DESIGN



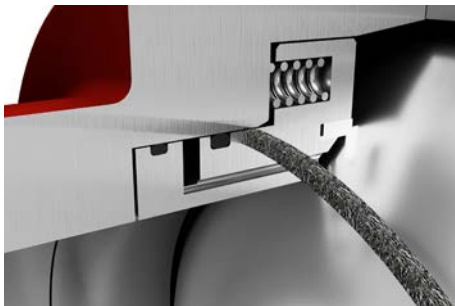
Our Ball valves are designed and manufactured in such a way that when the movement shaft holders and seals are removed, it will not be possible for the stem to go out of the valve due to the effect of pressure, as described by the standards. The stem is designed with a wide lower flange. In this way, the body cover part prevents the stem from dislodging and prevents a possible explosion. This feature allows the shaft seal to be replaced even when the valve is under pressure.

FIRE-SAFE DESIGN

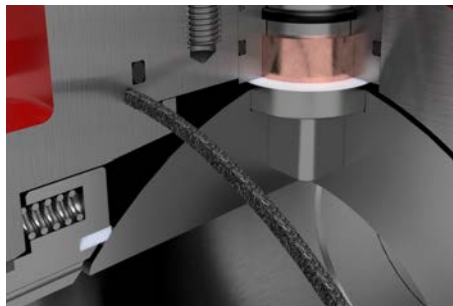


BatuValve ball valves have been subjected to fire tests in accordance with API 6Fa and ISO 10497 standards. Regardless of the soft seat material, they will likely be damaged when exposed to fire conditions. BatuValve offers a fire resistant design that can greatly prevent leaks from seals when valves are damaged by fire. If Teflon and O'ring materials are damaged, a metal-to-metal seal is formed between the secondary metal seat and the ball. The slot-to-body graphite seals, graphite body seals, and graphite gasket end caps are designed to withstand high temperature and will remain undamaged.

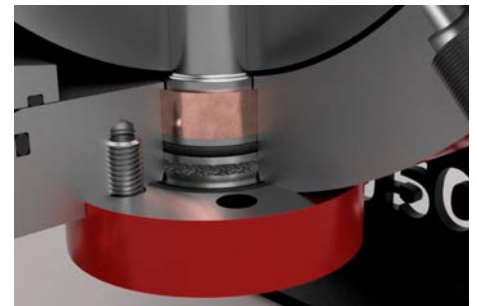
Bonnet



Seat

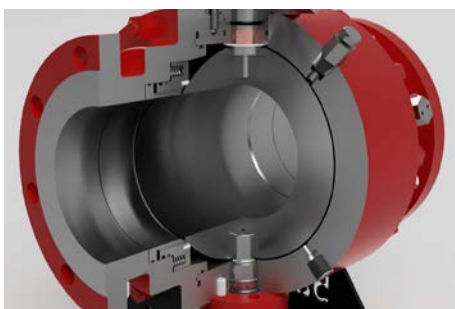


Body



Trunnion

DRAIN & VENT DESIGN *

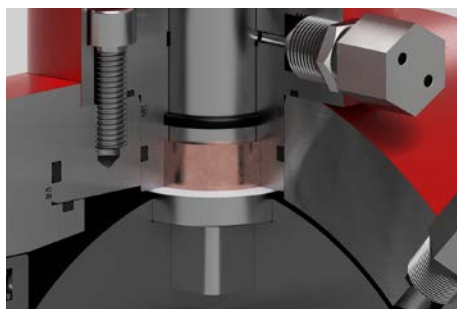


Valves are manufactured with drain and vent discharge outlets designed in accordance with the connection dimensions defined by the standards for the safe discharge of the pressurized fluid or gas remaining in the body when the valves are brought to the closed position.

* Specify during the order.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

ANTI STATIC DESIGN



Ball Valves used in flammable and combustible fluid circuits such as petrol, LPG, LNG must be protected against static electricity. The spring and ball used in the stem ensure that any static electricity that may occur is grounded to the pipeline. In this way, the electrostatic charge that may occur on the ball is prevented.

BATU Ball Valves are designed and manufactured in accordance with these requirements.

LUBRICATION AND EMERGENCY SEALANT INJECTION *

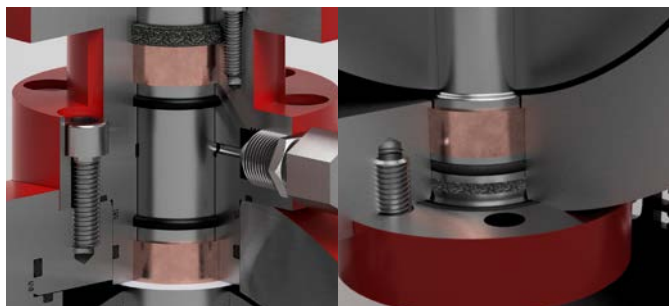


Bonnet

Cover

Glacers on the bonnet and covers allow easy lubrication of the drive shaft and the hoops. Lubrication should be carried out periodically. These greaser can be used to inject sealant in emergency situations such as fire and other accidents.

LOW TORQUE

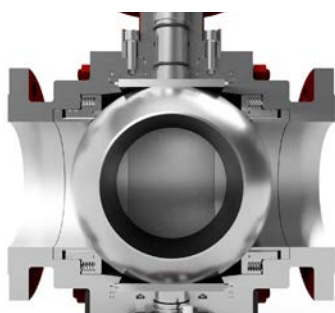


Throat

Seat

All split body trunnion ball valves have a very low torque value. Every valve produced is subjected to torque test.

HIGH PRESSURE – LOW PRESSURE SEALING DESIGN



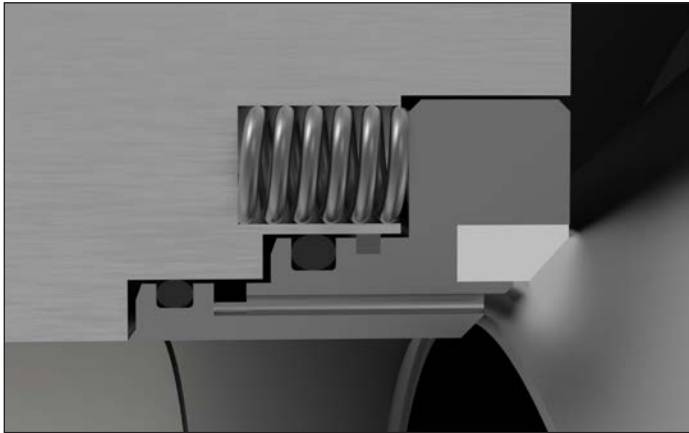
The sealing performance of the ball valves at higher pressures are more important than at low pressures. At high pressures, sealing is ensured by forming a good contact between the sealing ring and the ball surface with the effect of the fluid pressure applied from the back surface of the Sealing seat ring. When the pressure behind the ring reaches a low value, this contact force decreases. In this case, the spring force supporting the seat ring ensures enough force is applied so the contact between the sealing ring and the ball surface and the sealing function are maintained.

* Specify during the order.

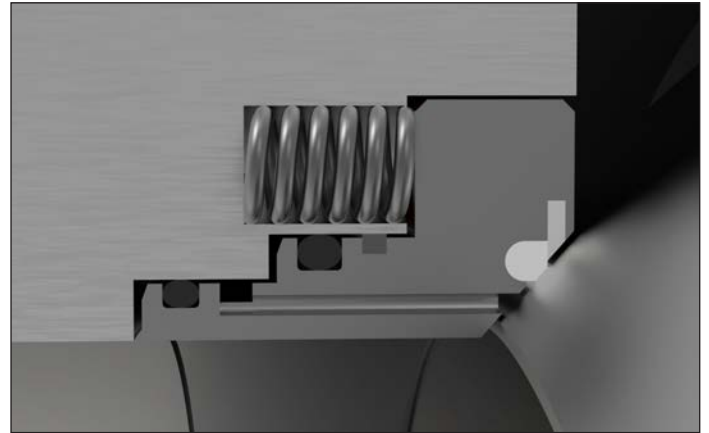
BATUSAN reserves the right to change design, construction and material while staying within the standards.

SEAT RING DESIGN

SOFT SEAT DESIGN



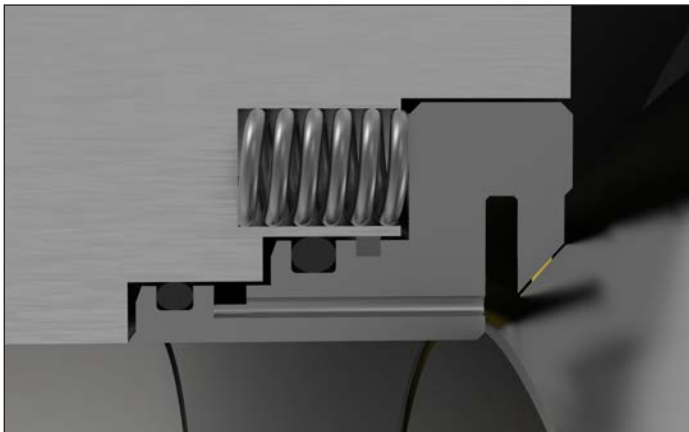
Soft Seat Design



*Primary Metal Secondary Soft Seat Design **

In standard trunnion ball valves, a flexible teflon material is placed between the seat and the ball to provide a soft seating motion and sealing in addition to the metal-to-metal fit.

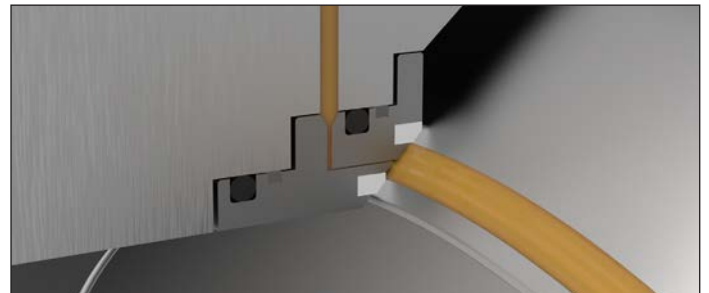
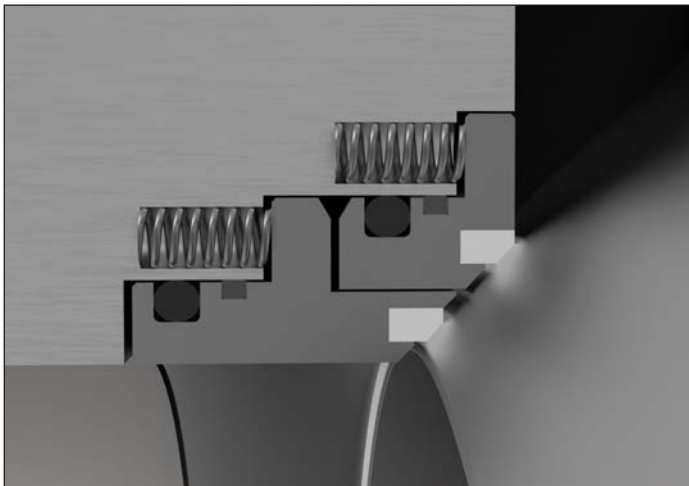
METAL TO METAL SEAT DESIGN *



*Figure-3 - Metal to metal hoop design**

If there are abrasive substances in the pipeline or temperatures that prevent the use of Teflon, metal-to-metal hoop designs may be preferred. The areas where the ball and the seat touch each other have a hard surface.

DOUBLE SEAT DESIGN *



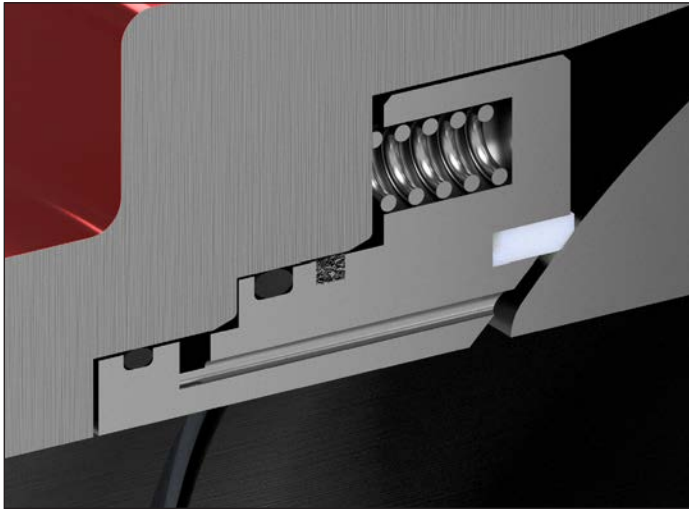
Trunnion valves use double seat and double teflon to achieve greater sealing.

* Specify during the order.

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SEAT

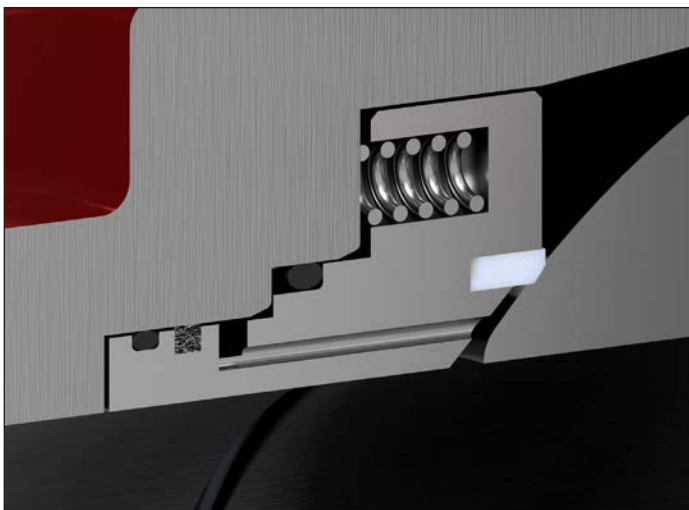
SINGLE PISTON EFFECT (SPE)



This is the standard type of bearing. When pressure is applied from both sides, SPE bearings are pushed towards the ball by the piston effect, providing a tight closing and sealing. If the pressure in the body cavity exceeds the pressure on either side of the line while the valve is in the closed position, the bearing on that side will be pushed back and the body pressure will be discharged to the low-pressure side of the line. Due to this feature, SPE type bearings are also called “Self-pressure relieving”, which discharge high pressure on their own.

Typical Application Areas: Pipeline ball valves in liquid services where it is necessary to prevent pressure increase in the body cavity due to temperature changes.

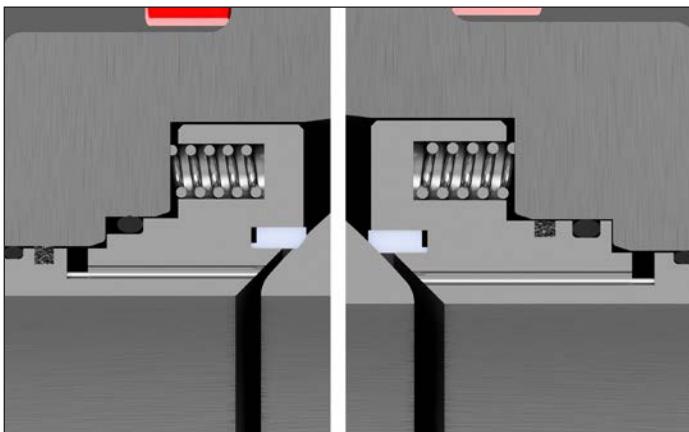
DOUBLE PISTON EFFECT (DPE) *



It is an optional ring-seat type. DPE seats are designed to be pushed towards the ball by the piston effect in both cases, whether the pressure comes from the valve body cavity or from the upstream or downstream side of the pipeline. DPE seated valves do not automatically release the pressure in the body cavity. Therefore, it is recommended to use a relief valve in liquid services.

Typical application areas; It is recommended in welded body valves when it is necessary to create an additional safe barrier between the upstream and downstream sides and where the maintenance of the seats is not foreseen.

SINGLE/ DOUBLE PISTON EFFECT COMBINATION (SPE-DPE) *



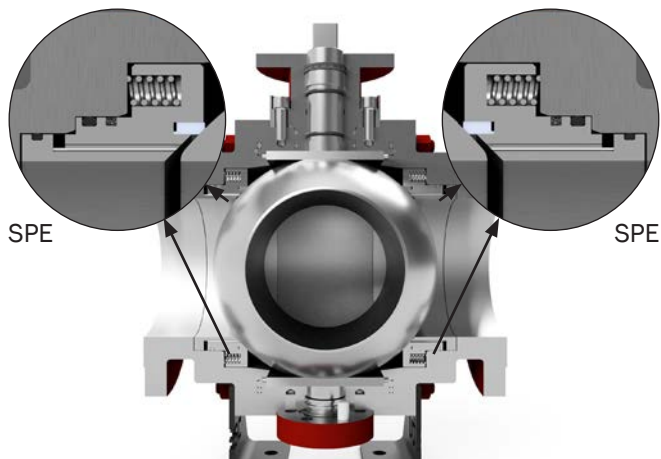
Upstream of the line, the SPE seat provides self-pressure relief. Downstream, the DPE seat provides a double barrier in case of damage to the upstream seat. This configuration includes a preferred installation orientation with the SPE seat facing upwards. With SPE-DPE configurations, the cavity discharge always occurs via the SPE seat.

Typical applications: Booster valves, Pig launchers / receivers. The DPE seat provides double insulation to the Pig trap and also allows automatic relief of the body cavity in the event of pressure build-up.

* Specify during the order.

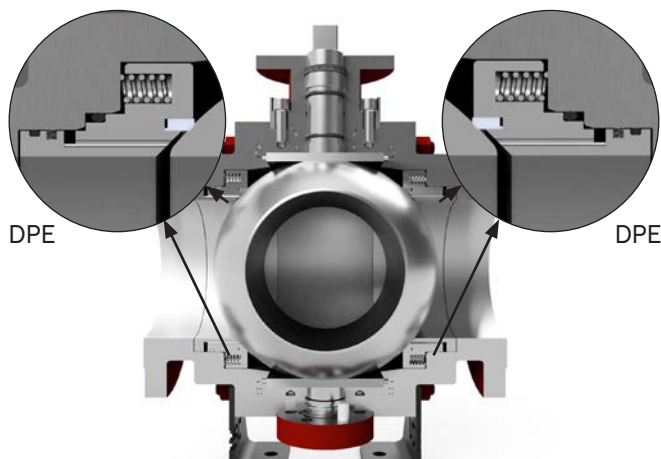
BATUSAN reserves the right to change design, construction and material while staying within the standards.

DOUBLE BLOCK AND BLEED DESIGN (DBB)



This is the standart seat type. When pressure is applied on both sides, SPE-SPE seats are pushed towards the ball with the effect of a piston, providing a tight closing and sealing. If the pressure in the stem cavity rises above the pressure on either side of the line while the valve is in the closed position, the seat on that side will be pushed back and the in-shell pressure will be released to the low pressure side of the line. Due to this feature, SPE type seats are also called “Self pressure relieving”, which releases high pressure by itself. Typical Fields of Application: Pipeline ball valves in fluid services where the pressure increase in the body cavity due to temperature changes is required.

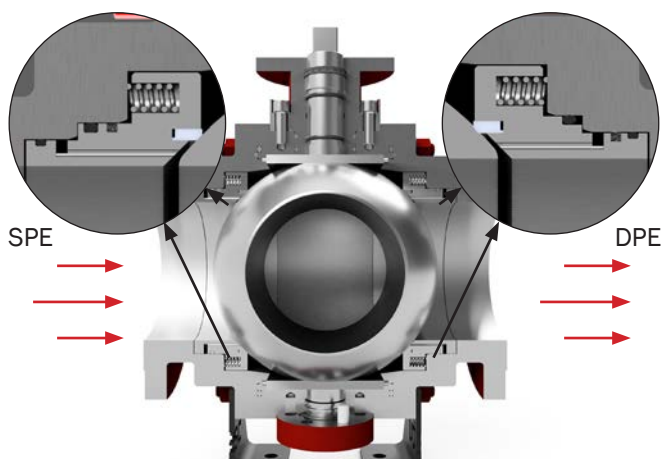
DOUBLE ISOLATION AND BLEED (DIB 1) *



It is an optionally available seat type. DPE seats, whether the pressure comes from the valve body cavity or from the upper or lower side of the pipeline; In both cases, it is designed to be pushed towards the sphere by the piston effect. DPE seated valves do not automatically relieve pressure in the body cavity. For this reason, the use of a drain valve is recommended in fluid services.

Typical application areas; where it is necessary to create an additional safety barrier between the upstream and downstream sides and where maintenance of the seats is not envisaged. It is also recommended for valves with welded body.

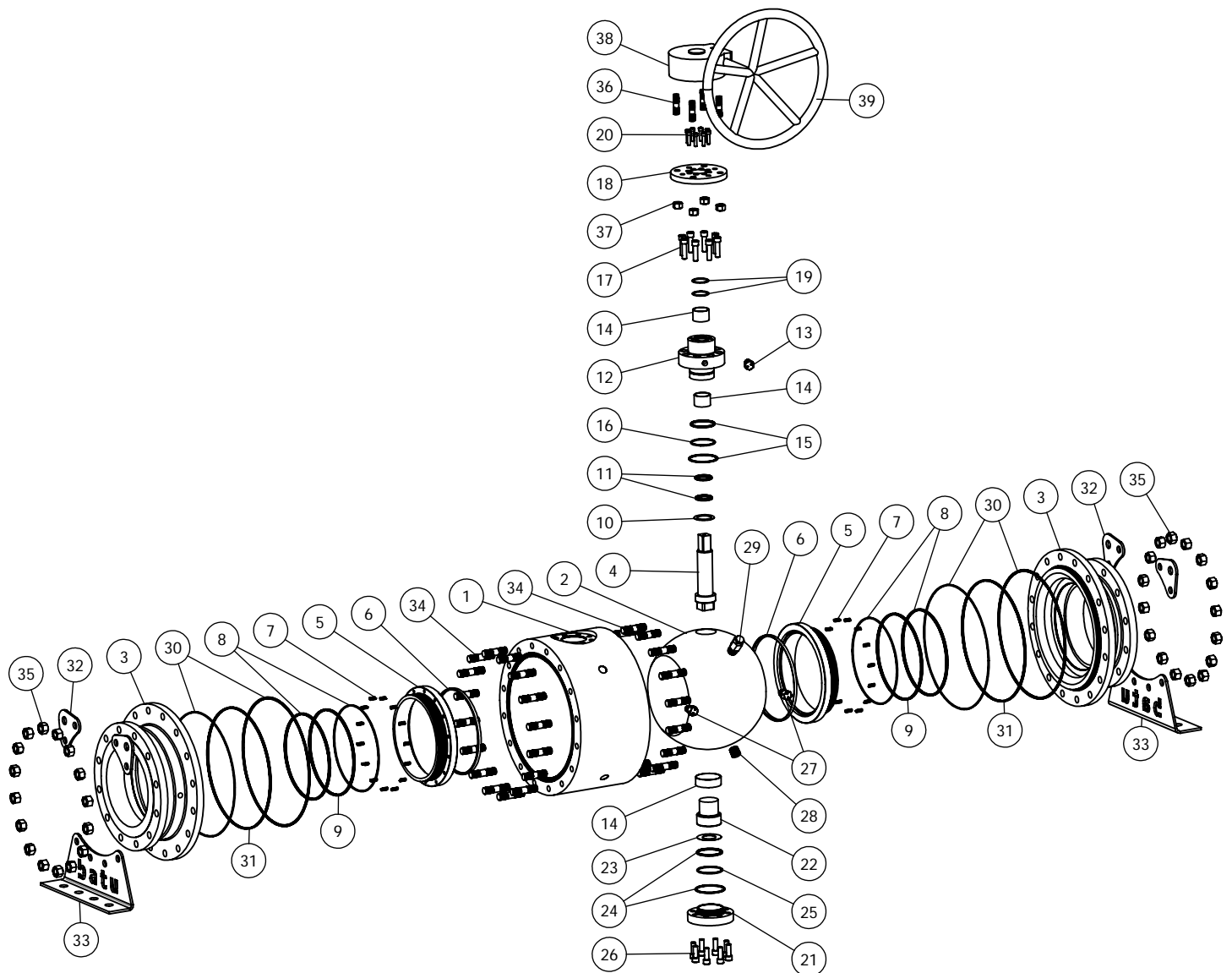
DOUBLE ISOLATION AND BLEED (DIB 2) *



On the upstream side of the line, the SPE seat provides self-pressure relief. On the downstream side, the DPE seat provides a double barrier in case the upstream seat is damaged. This confi guration includes a preferred installation direction with the SPE seat facing up. With SPE-DPE confi gurations, the cavity pressure evacuation always takes place via the SPE seat side .

* Specify during the order.

BATUSAN reserves the right to change design, construction and material while staying within the standards.



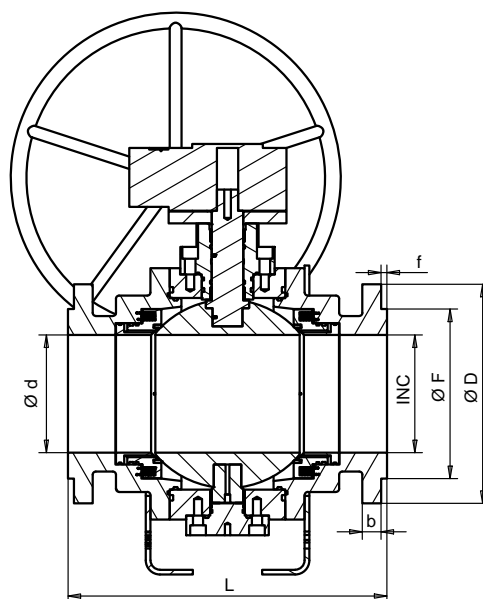
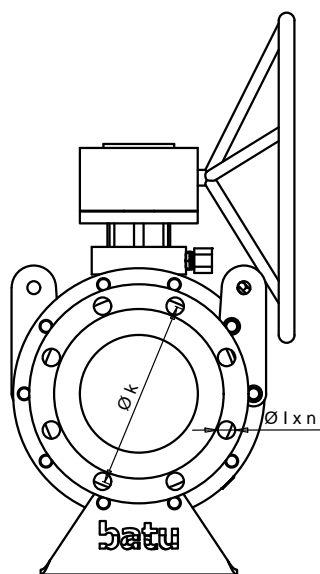
Item	Part Name
1	BODY
2	BALL
3	COVER
4	STEM
5	SEAT RETAINER
6	SEAT
7	SEAT SPRING
8	SEAT SEAL
9	FIRE SAFE RING
10	STEM PACKING
11	BONNET SEAL
12	BONNET
13	BONNET GREASER

Item	Part Name
14	DRY BEARING
15	BONNET SEAL
16	FIRE SAFE RING
17	BONNET BOLT
18	BONNET FLANGE
19	FIRE SAFE RING
20	FLANGE BOLT
21	TRUNNION PLATE
22	TRUNNION STEM
23	TRUNNION PACKING
24	TRUNNION SEAL
25	FIRE SAFE RING
26	TRUNNION BOLT

Item	Part Name
27	GREASER
28	DRAIN
29	VENT
30	BODY SEAL
31	FIRE SAFE RING
32	LIFTING DEVICE
33	SUPPORT
34	STUD
35	NUT
36	BOLT
37	NUT
38	GEAR BOX
39	WHEEL

TYPE: BKV-FL-TG CLASS 150 (PN 20)

FULL BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
19.6 Bar	17.7 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
20	150	29.4 Bar	21.6 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1	25	127	140	-	108	12,7	1,5	6,35	50,8	63,5	79,2	15,9	4
1 ¼	32	140	153	-	117	14,2	1,5	6,35	63,5	73,2	88,9	15,9	4
1 ½	40	165	178	190	127	15,9	1,5	6,35	73,0	82,6	98,6	15,9	4
2	50	178	191	216	152	17,5	1,5	6,35	91,9	102,0	120,6	19,1	4
2 ½	65	191	203	241	178	20,6	1,5	6,35	104,6	121,0	139,7	19,1	4
3	80	203	216	283	190	22,4	1,5	6,35	127,0	133,0	152,4	19,1	4
4	100	229	241	305	229	22,4	1,5	6,35	157,2	171,0	190,5	19,1	8
6	150	394	406	457	279	23,9	1,5	6,35	215,9	219,0	241,3	22,3	8
8	201	457	470	521	343	26,9	1,5	6,35	269,7	273,0	298,4	22,3	8
10	252	533	546	559	406	28,4	1,5	6,35	323,8	330,0	362,0	25,4	12
12	303	610	622	635	483	30,2	1,5	6,35	381,0	406,0	431,8	25,4	12
14	334	686	699	762	533	33,3	1,5	6,35	412,8	425,0	476,2	28,6	12
16	385	762	775	838	597	35,1	1,5	6,35	469,9	483,0	539,8	28,6	16
18	436	864	876	914	635	38,1	1,5	6,35	533,4	546,0	577,8	31,8	16
20	487	914	927	991	693	41,1	1,5	6,35	584,2	597,0	635,0	31,8	20
24	589	1067	1080	1143	813	46,0	1,5	6,35	692,2	711,0	749,3	35,0	20
26	633	1143	-	1245	870	66,8	1,5	-	749,0	-	806,4	35,0	24
28	684	1245	-	1346	927	69,8	1,5	-	800,0	-	863,6	35,0	28
30	735	1295	-	1397	984	73,2	1,5	-	857,0	-	914,4	35,0	28
32	779	1372	-	1524	1060	79,5	1,5	-	914,0	-	977,9	41,2	28
34	830	1473	-	1626	1111	81	1,5	-	965,0	-	1028,7	41,2	32
36	874	1524	-	1727	1168	88,9	1,5	-	1022,0	-	1085,8	41,2	32
40	976	1753	-	-	1289	90	1,5	-	1124	-	1200	41	36
42	1020	1855	-	-	1346	97	1,5	-	1194	-	1257	41	36
48	1166	2134	-	-	1511	108	1,5	-	1359	-	1422	41	44
56	1360	2489	-	-	1746	124	1,5	-	1575	-	1651	48	48

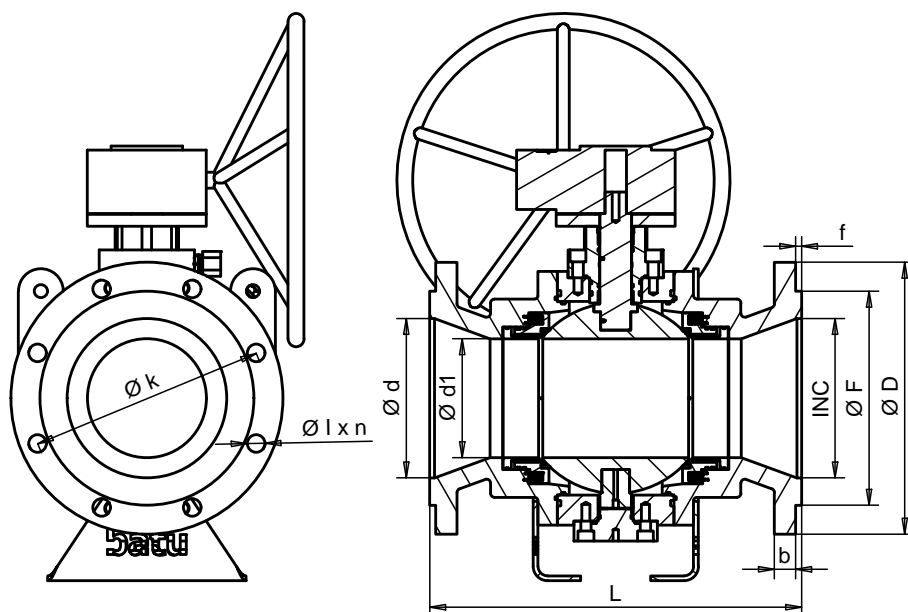
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 150 (PN 20)

REDUCED BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
19.6 Bar	17.7 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
20	150	29.4 Bar	21.6 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	Ø d1	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1 ¼ x 1	32	25	140	153		117	14,2	1,5	6,35	63,5	73,2	88,9	15,9	4
1 ½ x 1 ¼	40	32	165	178	190	127	15,9	1,5	6,35	73,0	82,6	98,6	15,9	4
2 x 1 ½	50	40	178	191	216	152	17,5	1,5	6,35	91,9	102,0	120,6	19,1	4
2 ½ x 2	65	50	191	203	241	178	20,6	1,5	6,35	104,6	121,0	139,7	19,1	4
3 x 2	80	50	203	216	283	190	22,4	1,5	6,35	127,0	133,0	152,4	19,1	4
4 x 3	100	80	229	241	305	229	22,4	1,5	6,35	157,2	171,0	190,5	19,1	8
6 x 4	150	100	394	406	457	279	23,9	1,5	6,35	215,9	219,0	241,3	22,3	8
8 x 6	201	150	457	470	521	343	26,9	1,5	6,35	269,7	273,0	298,4	22,3	8
10 x 8	252	201	533	546	559	406	28,4	1,5	6,35	323,8	330,0	362,0	25,4	12
12 x 10	303	252	610	622	635	483	30,2	1,5	6,35	381,0	406,0	431,8	25,4	12
14 x 10	334	252	686	699	762	533	33,3	1,5	6,35	412,8	425	476,2	28,6	12
14 x 12	334	303	686	699	762	533	33,3	1,5	6,35	412,8	425,0	476,2	28,6	12
16 x 12	385	303	762	775	838	597	35,1	1,5	6,35	469,9	483	539,8	28,6	16
16 x 14	385	334	762	775	838	597	35,1	1,5	6,35	469,9	483,0	539,8	28,6	16
18 x 16	436	385	864	876	914	635	38,1	1,5	6,35	533,4	546,0	577,8	31,8	16
20 x 16	487	385	914	927	991	693	41,1	1,5	6,35	584,2	597	635	31,8	20
20 x 18	487	436	914	927	991	693	41,1	1,5	6,35	584,2	597,0	635,0	31,8	20
24 x 20	589	487	1067	1080	1143	813	46,0	1,5	6,35	692,2	711,0	749,3	35,0	20
30 x 24	735	589	1295	-	1397	984	73,2	1,5	-	857,0	-	914,4	35	28
36 x 30	874	735	1524	-	1727	1168	88,9	1,5	-	1022,0	-	1085,8	41,2	32

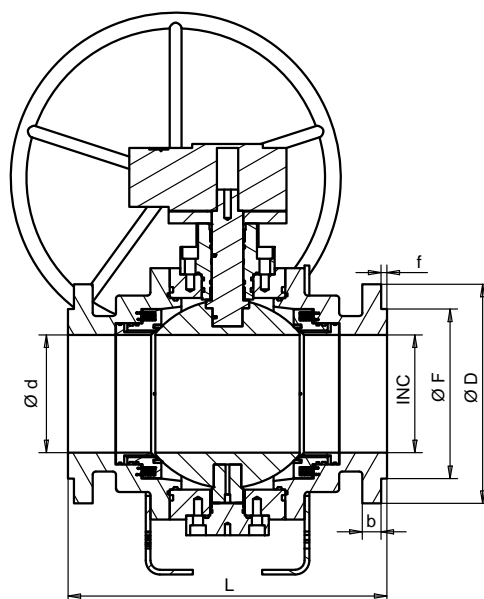
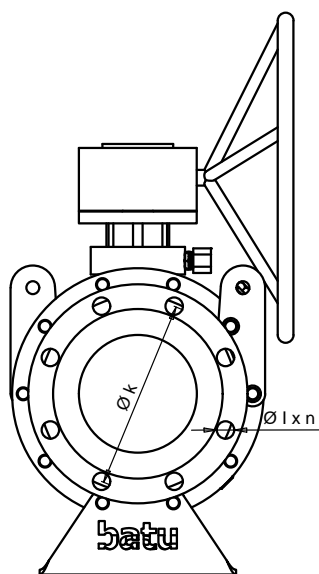
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 300 (PN 50)

FULL BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
51.1 Bar	46.6 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
50	300	76.7 Bar	56.2 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1	25	165	178	-	124	15,7	1,5	6,35	50,8	69,8	88,9	19,1	4
1 ¼	32	178	191	-	133	17,5	1,5	6,35	63,5	79,2	98,6	19,1	4
1 ½	40	190	203	190	155	19,0	1,5	6,35	73,0	90,4	114,3	22,3	4
2	50	216	232	216	165	20,6	1,5	7,92	91,9	108,0	127,0	19,1	8
2 ½	65	241	257	241	190	23,9	1,5	7,92	104,6	127,0	149,4	22,3	8
3	78	283	298	283	210	26,9	1,5	7,92	127,0	146,0	168,1	22,3	8
4	100	305	321	305	254	30,2	1,5	7,92	157,2	175,0	200,2	22,3	8
6	150	403	419	457	318	35,1	1,5	7,92	215,9	241,0	269,7	22,3	12
8	201	502	518	521	381	39,6	1,5	7,92	269,7	302,0	330,2	25,4	12
10	252	568	584	559	444	46,0	1,5	7,92	323,8	356,0	387,4	28,6	16
12	303	648	664	635	521	49,3	1,5	7,92	381,0	413,0	450,8	31,8	16
14	334	762	778	762	584	52,3	1,5	7,92	412,8	457,0	514,4	31,8	20
16	385	838	854	838	648	55,6	1,5	7,92	469,9	508,0	571,5	35,0	20
18	436	914	930	914	711	58,7	1,5	7,92	533,4	575,0	628,6	35,0	24
20	487	991	1010	991	775	62,0	1,5	9,52	584,2	635,0	685,8	35,0	24
24	589	1143	1165	1143	914	68,3	1,5	11,13	692,2	749,0	812,8	41,3	24
26	633	1245	1270	1245	972	78,0	1,5	12,7	749,0	810,0	876,3	44,5	28
28	684	1346	1372	1346	1035	84,3	1,5	12,7	800,0	861,0	939,8	44,5	28
30	735	1397	1422	1397	1092	90,7	1,5	12,7	857,0	917,0	997,0	47,6	28
32	779	1524	1553	1524	1149	97,0	1,5	14,27	914,0	984,0	1054,1	50,8	28
34	830	1626	1654	1626	1206	100,1	1,5	14,27	965,0	1035,0	1104,9	50,8	28
36	874	1727	1756	1727	1270	103,4	1,5	14,27	1022,0	1092,0	1168,4	54,0	32
40	976	1956	-	-	1238	114	1,5	-	1086	-	1156	45	32
42	1020	2083	-	-	1289	119	1,5	-	1137	-	1206,5	45	32
48	1166	2170	-	-	1467	134	1,5	-	1302	-	1372	51	32
56	1360	2743	-	-	1708	154	1,5	-	1518	-	1600	60	28

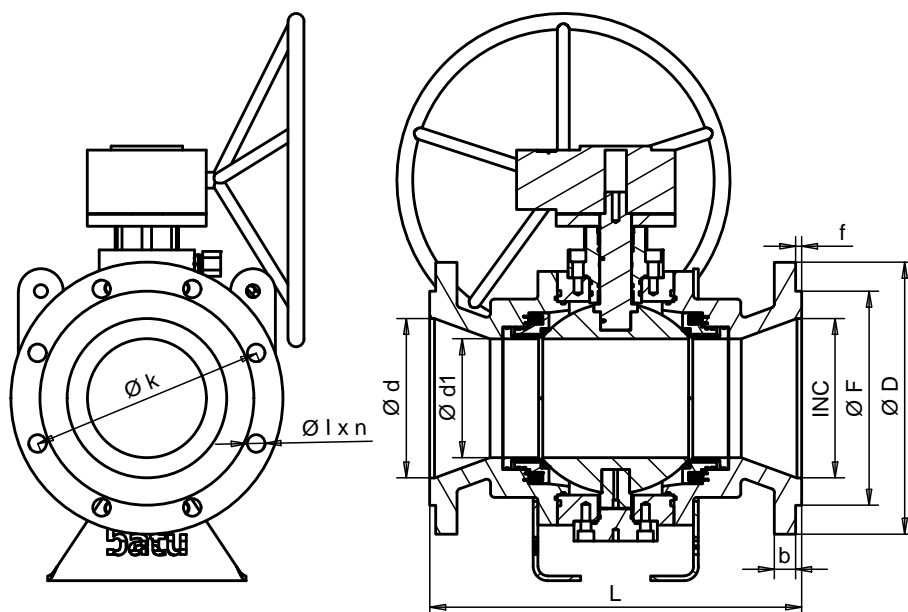
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 300 (PN 50)

REDUCED BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
51.1 Bar	46.6 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
50	300	76.7 Bar	56.2 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	Ø d1	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1 ¼ x 1	32	25	178	191	-	133	17,5	1,5	6,35	63,5	79,2	98,6	19,1	4
1 ½ x 1 ¼	40	32	190	203	190	155	19,0	1,5	6,35	73,0	90,4	114,3	22,3	4
2 x 1 ½	50	40	216	232	216	165	20,6	1,5	7,92	91,9	108,0	127,0	19,1	8
2 ½ x 2	65	50	241	257	241	190	23,9	1,5	7,92	104,6	127,0	149,4	22,3	8
3 x 2	80	50	283	298	283	210	26,9	1,5	7,92	127,0	146,0	168,1	22,3	8
4 x 3	100	80	305	321	305	254	30,2	1,5	7,92	157,2	175,0	200,2	22,3	8
6 x 4	150	100	403	419	457	318	35,1	1,5	7,92	215,9	241,0	269,7	22,3	12
8 x 6	201	150	502	518	521	381	39,6	1,5	7,92	269,7	302,0	330,2	25,4	12
10 x 8	252	201	568	584	559	444	46,0	1,5	7,92	323,8	356,0	387,4	28,6	16
12 x 10	303	252	648	664	635	521	49,3	1,5	7,92	381,0	413,0	450,8	31,8	16
14 x 10	334	252	762	778	762	584	52,3	1,5	7,92	412,8	457,0	514,4	31,8	20
14 x 12	334	303	762	778	762	584	52,3	1,5	7,92	412,8	457,0	514,4	31,8	20
16 x 12	385	303	838	854	838	648	55,6	1,5	7,92	469,9	508,0	571,5	35,0	20
16 x 14	385	334	838	854	838	648	55,6	1,5	7,92	469,9	508,0	571,5	35,0	20
18 x 16	436	385	914	930	914	711	58,7	1,5	7,92	533,4	575,0	628,6	35,0	24
20 x 16	487	385	991	1010	991	775	62,0	1,5	9,52	584,2	635,0	685,8	35,0	24
20 x 18	487	436	991	1010	991	775	62,0	1,5	9,52	584,2	635,0	685,8	35,0	24
24 x 20	589	487	1143	1165	1143	914	68,3	1,5	11,13	692,2	749,0	812,8	41,3	24
30 x 24	735	589	1397	1422	1397	1092	90,7	1,5	12,7	857,0	917,0	997,0	47,6	28
36 x 30	874	735	1727	1756	1727	1270	103,4	1,5	14,27	1022,0	1092,0	1168,4	54,0	32

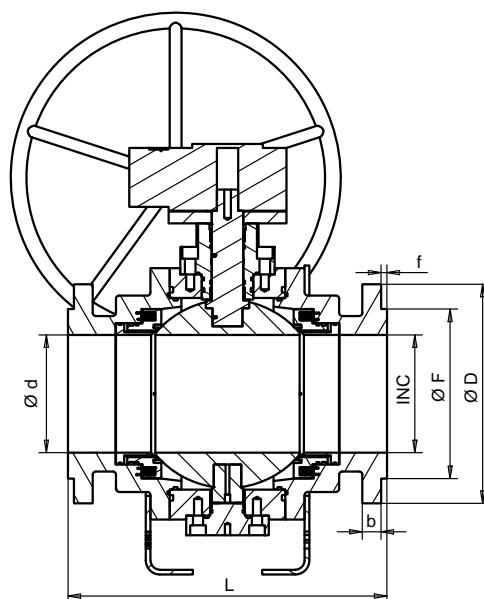
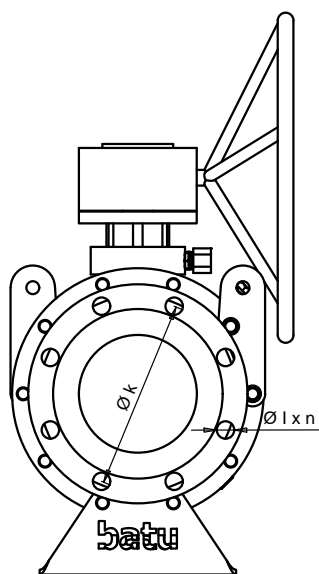
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 600 (PN 100)

FULL BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
102.1 Bar	93.2 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
100	600	153.2 Bar	112.3 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1	25	216	216	216	124	17,5	6,4	6,35	50,8	69,8	88,9	19,1	4
1 ¼	32	229	229	229	133	20,6	6,4	6,35	63,5	79,2	98,6	19,1	4
1 ½	40	241	241	241	155	22,4	6,4	6,35	73,0	90,4	114,3	22,3	4
2	50	292	295	292	165	25,4	6,4	7,92	91,9	108,0	127,0	19,1	8
2 ½	65	330	333	330	190	28,4	6,4	7,92	104,6	127,0	149,4	22,3	8
3	80	356	359	356	210	31,8	6,4	7,92	127,0	146,0	168,1	22,3	8
4	100	432	435	432	273	38,1	6,4	7,92	157,2	175,0	215,9	25,4	8
6	150	559	562	559	356	47,8	6,4	7,92	215,9	241,0	292,1	28,6	12
8	201	660	664	660	419	55,6	6,4	7,92	269,7	302,0	349,2	31,8	12
10	252	787	791	787	508	63,5	6,4	7,92	323,8	356,0	431,8	35,0	16
12	303	838	841	838	559	66,5	6,4	7,92	381,0	413,0	489,0	35,0	20
14	334	889	892	889	603	69,8	6,4	7,92	412,8	457,0	527,0	38,1	20
16	385	991	994	991	686	76,2	6,4	7,92	469,9	508,0	603,2	41,3	20
18	436	1092	1095	1092	743	82,6	6,4	7,92	533,4	575,0	654,0	44,5	20
20	487	1194	1200	1194	813	88,9	6,4	9,52	584,2	635,0	723,9	44,5	24
24	589	1397	1407	1397	940	101,6	6,4	11,13	692,2	749,0	838,2	50,8	24
26	633	1448	1461	1448	1016	108,0	6,4	12,7	749,0	810,0	914,4	50,8	28
28	684	1549	1562	1549	1073	111,3	6,4	12,7	800,0	861,0	965,2	54,0	28
30	735	1651	1664	1651	1130	114,3	6,4	12,7	857,0	917,0	1022,4	54,0	28
32	779	1778	1794	1778	1194	117,3	6,4	14,27	914,0	984,0	1079,5	60,3	28
34	830	1930	1946	1930	1245	120,6	6,4	14,27	965,0	1035,0	1130,3	60,3	28
36	874	2083	2099	2083	1314	124,0	6,4	14,27	1022,0	1092,0	1193,8	66,6	28

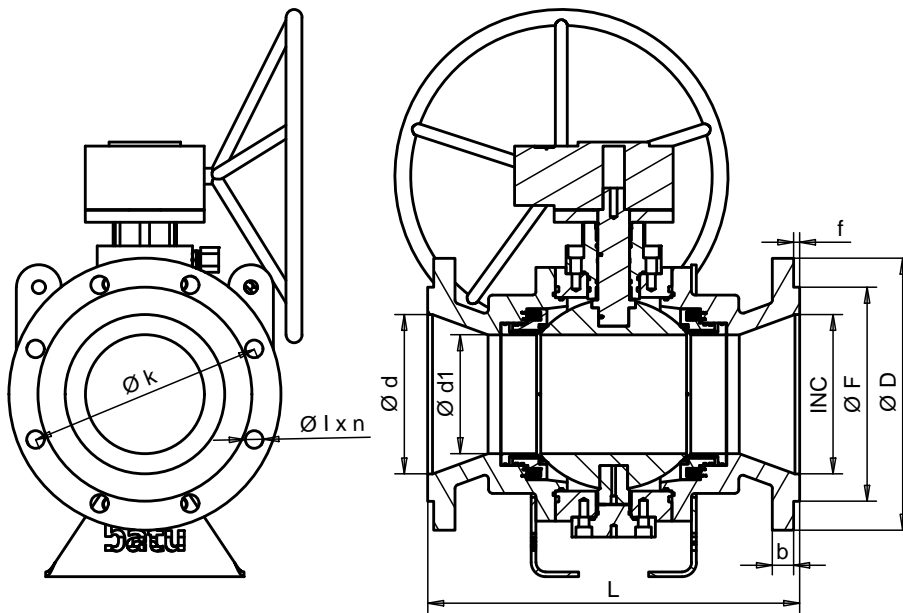
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 600 (PN 100)

REDUCED BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
102.1 Bar	93.2 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
100	600	153.2 Bar	112.3 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	Ø d1	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1 ¼ x 1	32	25	229	229	229	133	20,6	6,4	6,35	63,5	79,2	98,6	19,1	4
1 ½ x 1 ¼	40	32	241	241	241	155	22,4	6,4	6,35	73,0	90,4	114,3	22,3	4
2 x 1 ½	50	40	292	295	292	165	25,4	6,4	7,92	91,9	108,0	127,0	19,1	8
2 ½ x 2	65	50	330	333	330	190	28,4	6,4	7,92	104,6	127,0	149,4	22,3	8
3 x 2	80	50	356	359	356	210	31,8	6,4	7,92	127,0	146,0	168,1	22,3	8
4 x 3	100	80	432	435	432	273	38,1	6,4	7,92	157,2	175,0	215,9	25,4	8
6 x 4	150	100	559	562	559	356	47,8	6,4	7,92	215,9	241,0	292,1	28,6	12
8 x 6	201	150	660	664	660	419	55,6	6,4	7,92	269,7	302,0	349,2	31,8	12
10 x 8	252	201	787	791	787	508	63,5	6,4	7,92	323,8	356,0	431,8	35,0	16
12 x 10	303	252	838	841	838	559	66,5	6,4	7,92	381,0	413,0	489,0	35,0	20
14 x 10	334	252	889	892	889	603	69,8	6,4	7,92	412,8	457	527	38,1	20
14 x 12	334	303	889	892	889	603	69,8	6,4	7,92	412,8	457,0	527,0	38,1	20
16 x 12	385	303	991	994	991	686	76,2	6,4	7,92	469,9	508	603,2	41,3	20
16 x 14	385	334	991	994	991	686	76,2	6,4	7,92	469,9	508,0	603,2	41,3	20
18 x 16	436	385	1092	1095	1092	743	82,6	6,4	7,92	533,4	575,0	654,0	44,5	20
20 x 16	487	385	1194	1200	1194	813	88,9	6,4	9,52	584,2	635	723,9	44,5	24
20 x 18	487	436	1194	1200	1194	813	88,9	6,4	9,52	584,2	635,0	723,9	44,5	24
24 x 20	589	487	1397	1407	1397	940	101,6	6,4	11,13	692,2	749,0	838,2	50,8	24
30 x 24	735	589	1651	1664	1651	1130	114,3	6,4	12,7	857,0	917,0	1022,4	54,0	28
36 x 30	874	735	2083	2099	2083	1314	124,0	6,4	14,27	1022,0	1092,0	1193,8	66,6	28

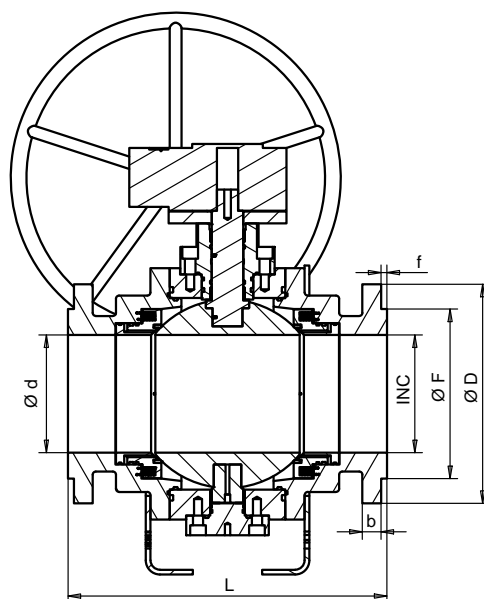
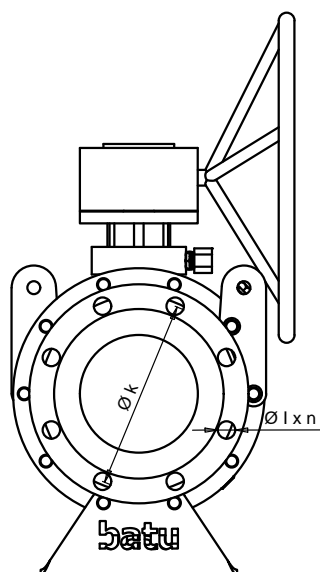
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 900 (PN 150)

FULL BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
153.2 Bar	139.8 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
150	900	229.8 Bar	168.5 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1	25	254	254	254	149	28,4	6,4	-	50,8	-	101,6	25,4	4
1 ¼	32	279	279	279	159	28,4	6,4	-	63,5	-	111,1	25,4	4
1 ½	40	305	305	305	178	31,8	6,4	-	73,0	-	124,0	28,6	4
2	50	368	371	368	216	38,1	6,4	7,92	91,9	-	165,1	25,4	8
2 ½	65	419	422	419	244	41,1	6,4	7,92	104,6	-	190,5	28,6	8
3	78	381	384	381	241	38,1	6,4	7,92	127,0	155,0	190,5	25,4	8
4	100	457	460	457	292	44,5	6,4	7,92	157,2	181,0	235,0	31,8	8
6	150	610	613	610	381	55,6	6,4	7,92	215,9	241,0	317,5	31,8	12
8	201	737	740	737	470	63,5	6,4	7,92	269,7	308,0	393,7	38,1	12
10	252	838	841	838	546	69,8	6,4	7,92	323,8	362,0	469,9	38,1	16
12	303	965	968	965	610	79,2	6,4	7,92	381,0	419,0	533,4	38,1	20
14	322	1029	1039	1029	641	85,9	6,4	11,13	412,8	467,0	558,8	41,3	20
16	373	1130	1140	1130	705	88,9	6,4	11,13	469,9	524,0	616,0	44,5	20
18	423	1219	1232	1219	787	101,6	6,4	12,7	533,4	594,0	685,8	50,8	20
20	471	1321	1334	1321	857	108,0	6,4	12,7	584,2	648,0	749,3	54,0	20
24	570	1549	1568	1549	1041	139,7	6,4	15,88	692,2	772,0	901,7	66,7	20
26	617	1651	-	1651	1086	124	6,4	-	749	-	952,5	73	20
28	665	1753	-	1753	1168	143	6,4	-	800	-	1022	79	20
30	712	1880	-	1880	1232	149	6,4	-	857	-	1086	79	20
32	760	2032	-	2032	1314	159	6,4	-	914	-	1156	86	20
36	855	2286	-	2286	1461	172	6,4	-	1022	-	1289	92	20

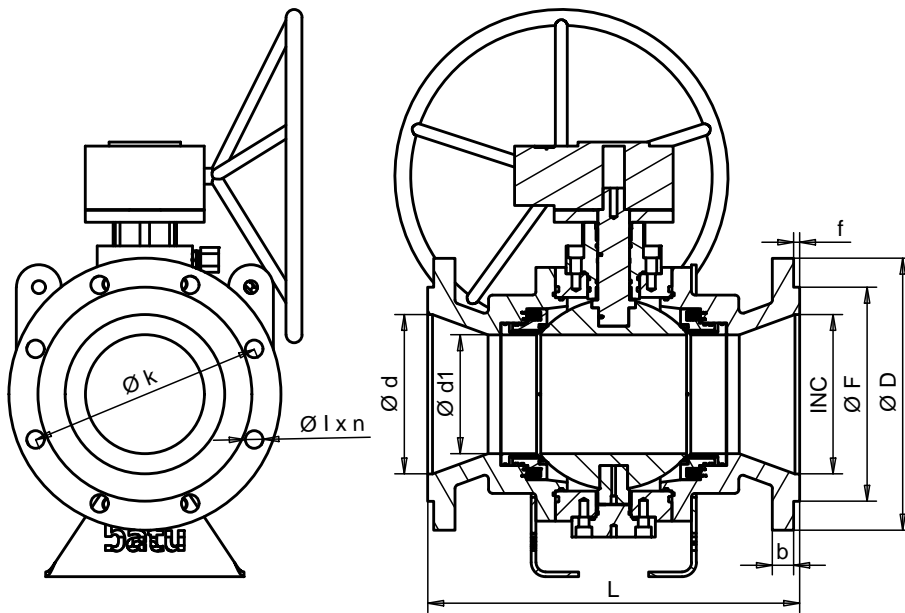
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 900 (PN 150)

REDUCED BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
153.2 Bar	139.8 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
150	900	229.8 Bar	168.5 Bar	6 Bar

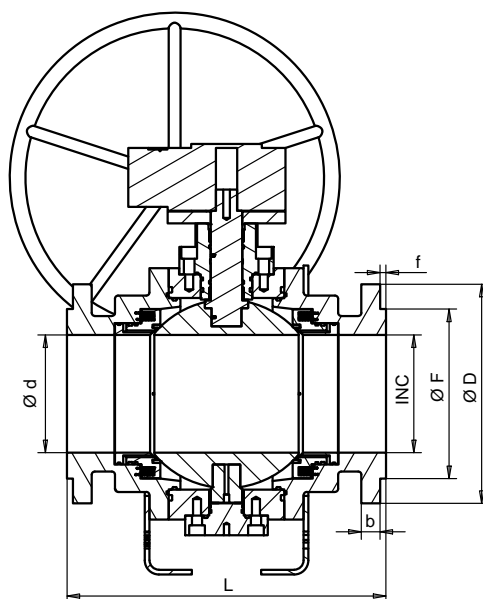
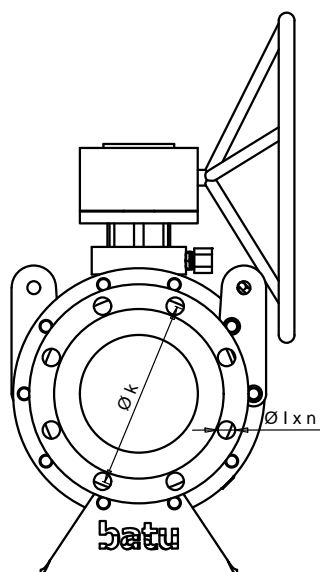
DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	Ø d1	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1 ¼ x 1	32	25	279	279	279	159	28,4	6,4	-	63,5	-	111,1	25,4	4
1 ½ x 1 ¼	40	32	305	305	305	178	31,8	6,4	-	73,0	-	124,0	28,6	4
2 x 1 ½	50	40	368	371	368	216	38,1	6,4	-	91,9	-	165,1	25,4	8
2 ½ x 2	65	50	419	422	419	244	41,1	6,4	-	104,6	-	190,5	28,6	8
3 x 2	78	50	381	384	381	241	38,1	6,4	7,92	127,0	155,0	190,5	25,4	8
4 x 3	100	78	457	460	457	292	44,5	6,4	7,92	157,2	181,0	235,0	31,8	8
6 x 4	150	100	610	613	610	381	55,6	6,4	7,92	215,9	241,0	317,5	31,8	12
8 x 6	201	150	737	740	737	470	63,5	6,4	7,92	269,7	308,0	393,7	38,1	12
10 x 8	252	201	838	841	838	546	69,8	6,4	7,92	323,8	362,0	469,9	38,1	16
12 x 10	303	252	965	968	965	610	79,2	6,4	7,92	381,0	419,0	533,4	38,1	20
14 x 10	334	252	1029	1039	1029	641	85,9	6,4	11,13	412,8	467,0	558,8	41,3	20
14 x 12	334	303	1029	1039	1029	641	85,9	6,4	11,13	412,8	467,0	558,8	41,3	20
16 x 12	385	303	1130	1140	1130	705	88,9	6,4	11,13	469,9	524,0	616,0	44,5	20
16 x 14	385	334	1130	1140	1130	705	88,9	6,4	11,13	469,9	524,0	616,0	44,5	20
18 x 16	436	385	1219	1232	1219	787	101,6	6,4	12,7	533,4	594,0	685,8	50,8	20
20 x 16	487	385	1321	1334	1321	857	108,0	6,4	12,7	584,2	648,0	749,3	54,0	20
20 x 18	487	436	1321	1334	1321	857	108,0	6,4	12,7	584,2	648,0	749,3	54,0	20
24 x 20	589	487	1549	1568	1549	1041	139,7	6,4	15,88	692,2	772,0	901,7	66,7	20
30 x 24	712	589	1880	-	1880	1232	149	6,4	-	857	-	1086	79	20
36 x 30	855	712	2286	-	2286	1461	172	6,4	-	1022	-	1289	92	20

In 4" and below valves, a handle is used instead of a handwheel.
 RF flange is used as standard. If a different flange is requested, it must be stated in the order form.
 BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 1500 (PN 250)

FULL BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
255.3 Bar	233.0 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
250	1500	383 Bar	280.8 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1	25	-	-	-	149	28,4	6,4	6,35	50,8	71,4	101,6	25,4	4
1 ¼	32	-	-	-	159	28,4	6,4	6,35	63,5	81,0	111,1	25,4	4
1 ½	40	-	-	-	178	31,8	6,4	6,35	73,0	91,9	124,0	28,6	4
2	50	368	371	368	216	38,1	6,4	7,92	91,9	124,0	165,1	25,4	8
2 ½	65	419	422	419	244	41,1	6,4	7,92	104,6	137,0	190,5	28,6	8
3	75	470	473	470	267	47,8	6,4	7,92	127,0	168,0	203,2	31,8	8
4	100	546	549	546	311	53,8	6,4	7,92	157,2	194,0	241,3	35,0	8
6	144	705	711	705	394	82,6	6,4	9,52	215,9	248,0	317,5	38,1	12
8	192	832	841	832	483	91,9	6,4	11,13	269,7	318,0	393,7	44,5	12
10	239	991	1000	991	584	108,0	6,4	11,13	323,8	371,0	482,6	50,8	12
12	287	1130	1146	1130	673	124,0	6,4	14,27	381,0	438,0	571,5	54,0	16
14	315	1257	1276	1257	749	133,4	6,4	15,88	412,8	489,0	635,0	60,4	16
16	360	1384	1047	1384	826	146,0	6,4	17,48	469,9	546,0	704,8	66,7	16
18	406	1537	1559	-	914	162,1	6,4	17,48	533,4	613,0	774,7	73,0	16
20	454	1664	1686	-	984	177,8	6,4	17,48	584,2	673,0	831,8	79,4	16

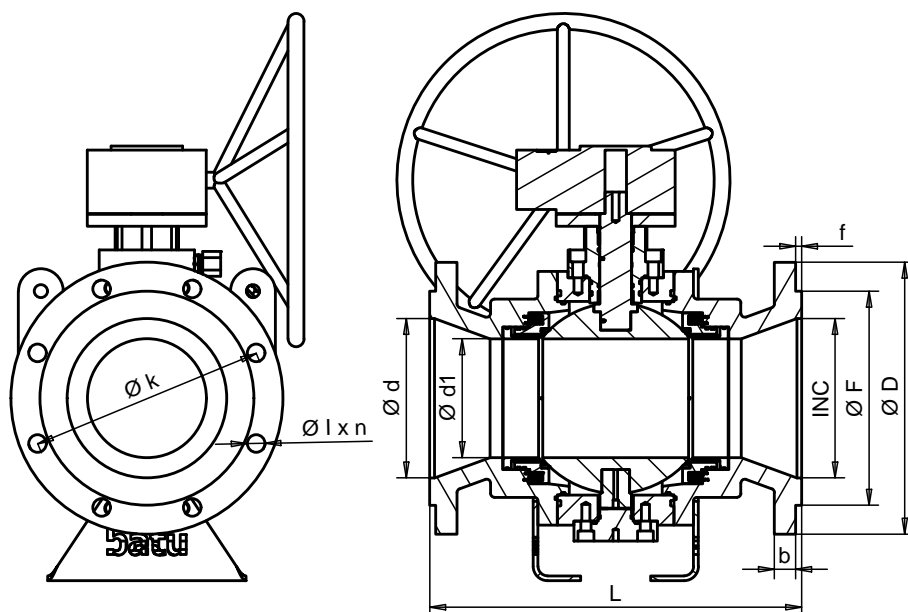
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 1500 (PN 250)

REDUCED BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
255.3 Bar	233.0 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
250	1500	383 Bar	280.8 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	Ø d1	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1 ¼ x 1	32	25	-	-	-	159	28,4	6,4	6,35	63,5	81,0	111,1	25,4	4
1 ½ x 1 ¼	40	32	-	-	-	178	31,8	6,4	6,35	73,0	91,9	124,0	28,6	4
2 x 1 ½	50	40	368	371	368	216	38,1	6,4	7,92	91,9	124,0	165,1	25,4	8
2 ½ x 2	65	50	419	422	419	244	41,1	6,4	7,92	104,6	137,0	190,5	28,6	8
3 x 2	75	50	470	473	470	267	47,8	6,4	7,92	127,0	168,0	203,2	31,8	8
4 x 3	100	75	546	549	546	311	53,8	6,4	7,92	157,2	194,0	241,3	35,0	8
6 x 4	155	100	705	711	705	394	82,6	6,4	9,52	215,9	248,0	317,5	38,1	12
8 x 6	192	144	832	841	832	483	91,9	6,4	11,13	269,7	318,0	393,7	44,5	12
10 x 8	239	192	991	1000	991	584	108,0	6,4	11,13	323,8	371,0	482,6	50,8	12
12 x 10	287	239	1130	1146	1130	673	124,0	6,4	14,27	381,0	438,0	571,5	54,0	16
14 x 10	315	239	1257	1276	1257	749	133,4	6,4	15,88	412,8	489,0	635,0	60,4	16
14 x 12	315	287	1257	1276	1257	749	133,4	6,4	15,88	412,8	489,0	635,0	60,4	16
16 x 12	360	287	1384	1047	1384	826	146,0	6,4	17,48	469,9	546,0	704,8	66,7	16
16 x 14	360	315	1384	1047	1384	826	146,0	6,4	17,48	469,9	546,0	704,8	66,7	16
18 x 16	406	360	1537	1559	-	914	162,1	6,4	17,48	533,4	613,0	774,7	73,0	16
20 x 16	454	360	1664	1686	-	984	177,8	6,4	17,48	584,2	673,0	831,8	79,4	16
20 x 18	454	406	1664	1686	-	984	177,8	6,4	17,48	584,2	673,0	831,8	79,4	16

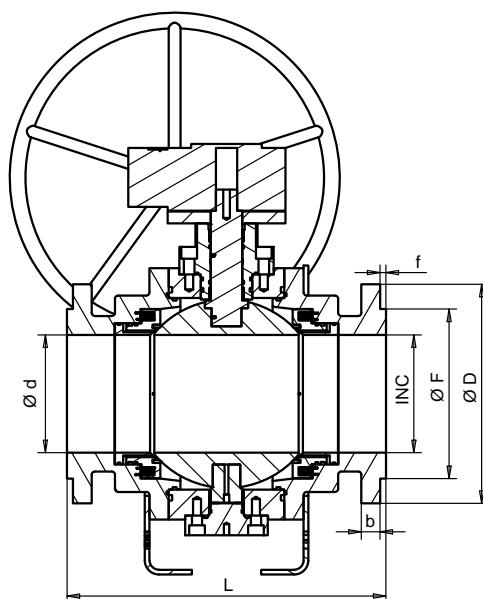
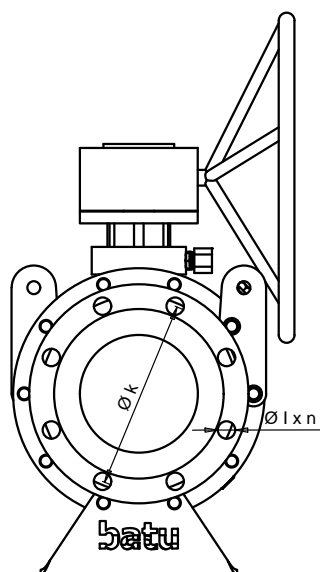
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 2500 (PN 420)

FULL BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
425.5 Bar	388.3 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
420	2500	638.3 Bar	468.1 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1	25	-	-	-	159	35,1	6,4	6,35	50,8	82,6	108,0	25,4	4
1 ¼	32	-	-	-	184	38,1	6,4	7,92	63,5	102,0	130,0	28,6	4
1 ½	38	-	-	-	203	44,4	6,4	7,92	73,0	114,0	146,0	31,8	4
2	42	451	454	451	235	50,8	6,4	7,92	91,9	133,0	171,4	28,6	8
2 ½	52	508	514	508	267	57,2	6,4	9,522	104,6	149,0	196,8	31,8	8
3	62	578	584	578	305	66,5	6,4	9,53	127,0	168,0	228,6	35,0	8
4	87	673	683	673	356	76,2	6,4	11,13	157,2	203,0	273,0	41,3	8
6	131	914	927	914	483	108,0	6,4	12,7	215,9	279,0	368,3	54,0	8
8	179	1022	1038	1022	552	127,0	6,4	14,27	269,7	340,0	438,2	54,0	12
10	223	1270	1292	1270	673	165,1	6,4	17,48	323,8	425,0	539,8	66,7	12
12	265	1422	1445	1422	762	184,2	6,4	17,48	381,0	495,0	619,3	73,0	12

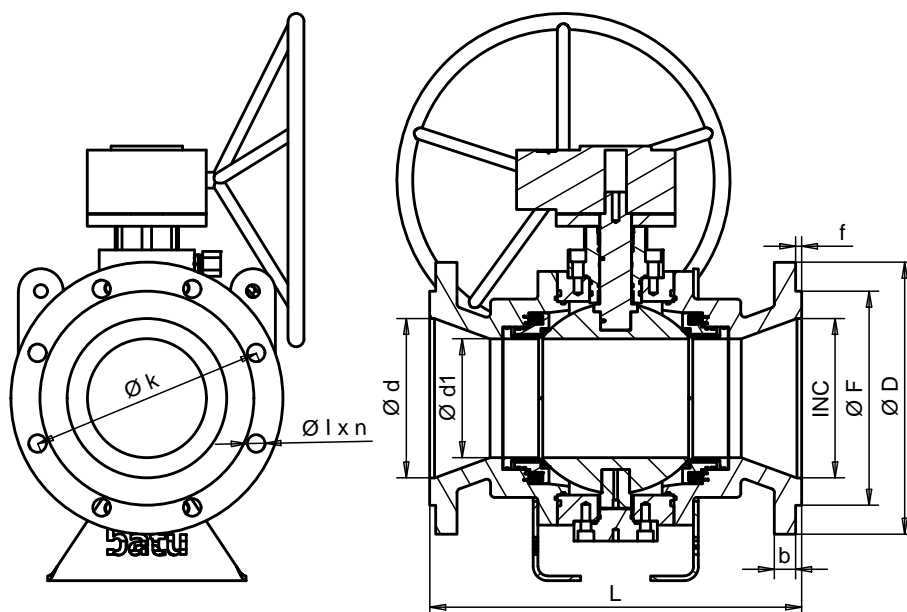
In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.

TYPE: BKV-FL-TG CLASS 2500 (PN 420)

REDUCED BORE / FLANGED



STANDARDS

Design	API 6D & ASME B16.34
Size	API 6D & ASME B16.10
Connections	ASME B16.5 & ASME B16.47 (Series A)

WORKING PRESSURE (Group 1.1 Materials)

-29 / +38 °C	100 °C
425.5 Bar	388.3 Bar

TEST PRESSURE

PN	Class	Shell	Closure	Gas
420	2500	638.3 Bar	468.1 Bar	6 Bar

DIMENSIONS AND CONNECTION DIMENSIONS

INC	Ø d	Ø d1	L (RF)	L (RTJ)	L (BW)	Ø D	b	f (RF)	f (RTJ)	Ø F (RF)	Ø F (RTJ)	Ø k	Ø l	n
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	adet
1 ¼ x 1	32	25	-	-	-	184	38,1	6,4	7,92	63,5	102,0	130,0	28,6	4
1 ½ x 1 ¼	38	32	-	-	-	203	44,4	6,4	7,92	73,0	114,0	146,0	31,8	4
2 x 1 ½	42	38	451	454	451	235	50,8	6,4	7,92	91,9	133,0	171,4	28,6	8
2 ½ x 2	52	42	508	514	508	267	57,2	6,4	9,522	104,6	149,0	196,8	31,8	8
3 x 2	62	42	578	584	578	305	66,5	6,4	9,53	127,0	168,0	228,6	35,0	8
4 x 3	87	62	673	683	673	356	76,2	6,4	11,13	157,2	203,0	273,0	41,3	8
6 x 4	131	87	914	927	914	483	108,0	6,4	12,7	215,9	279,0	368,3	54,0	8
8 x 6	179	131	1022	1038	1022	552	127,0	6,4	14,27	269,7	340,0	438,2	54,0	12
10 x 8	223	179	1270	1292	1270	673	165,1	6,4	17,48	323,8	425,0	539,8	66,7	12
12 x 10	265	223	1422	1445	1422	762	184,2	6,4	17,48	381,0	495,0	619,3	73,0	12

In 4" and below valves, a handle is used instead of a handwheel.

RF flange is used as standard. If a different flange is requested, it must be stated in the order form.

BATUSAN reserves the right to change design, construction and material while staying within the standards.



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Ball valve innovations enhance LNG and CNG station efficiency

New ball valve designs improve LNG and CNG station performance, offering better efficiency and reduced emissions.

By Zahra Farrokhi,
Batu Valve Türkiye



Ball valves engineered for demanding LNG and CNG applications

Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG) stations are pivotal in global energy infrastructure, offering cleaner alternatives to traditional fossil fuels. The efficiency and reliability of these stations depend on various factors, with valve technology playing a critical role. Ball valves have emerged as a preferred choice due to their robust design, ease of operation and reliability under high-pressure conditions. This article explores the latest advancements in ball valve technology driving improvements in efficiency and reliability in LNG and CNG stations, focusing on materials, sealing technologies, automation and maintenance practices.

The role of ball valves in LNG and CNG stations

Ball valves are widely used in LNG and CNG stations due to their ability to provide a tight seal, even under extreme conditions. Their design, featuring a spherical disc that controls flow through a hollow, perforated centre, allows for quick shutoff and efficient flow control. The evolution of ball valve technology has significantly enhanced their performance in terms of durability, operational efficiency and safety,

making them indispensable in the LNG and CNG sectors (Smith & Jones, 2023).

Advancements in ball valve materials

A key advancement in ball valve technology is the development of new materials that enhance valve performance under the demanding conditions of LNG and CNG applications. Traditional materials such as carbon steel are now being replaced or augmented with advanced alloys and composite materials that offer superior resistance to corrosion, wear and extreme temperatures (Doe & Roe, 2022).



Figure 1. Precision-engineered ball valves, key components in LNG and CNG flow control

For example, valves made from duplex stainless steel or Inconel alloys have demonstrated up to 30% longer service life in LNG applications compared to traditional materials. These materials also exhibit better resistance to the cryogenic temperatures typical of LNG stations, ensuring that the valves maintain their integrity and functionality even in harsh environments (Evans & Brown, 2023).

Innovations in sealing technology

Sealing technology has also seen significant improvements, particularly with the introduction of advanced polymer seals and metal-to-metal sealing systems. These innovations are crucial for maintaining the integrity of ball valves in high-pressure LNG and CNG systems (Garcia & Martinez, 2024). Advanced polymer seals, such as those made from perfluoroelastomers (FFKM), provide enhanced resistance to the wide temperature fluctuations and aggressive chemicals found in these environments. These seals have been shown to reduce leakage rates by up to 25%, contributing to overall system efficiency and safety (Garcia & Martinez, 2024). Furthermore, metal-to-metal sealing systems have been refined to offer even greater durability and reliability, particularly in applications where zero leakage is critical. This type of sealing is particularly advantageous in LNG stations, where the potential for leaks can have serious safety and environmental consequences (Evans & Brown, 2023).

Enhanced design and manufacturing techniques

Recent advancements in design and manufacturing techniques have also played a crucial role in the evolution of ball valve

Aspect	Traditional ball valves	Advanced ball valves
Material composition	Carbon steel, basic stainless steel	Duplex stainless steel, Inconel alloys, composites
Sealing technology	Basic elastomer seals	Advanced polymer seals, metal-to-metal sealing
Durability	Moderate, prone to wear and corrosion	High, enhanced resistance to corrosion and fatigue
Operational efficiency	Standard, with manual operation	High, with automation and smart technologies
Leakage rate	Higher, especially under extreme conditions	Lower, improved by advanced sealing technologies
Maintenance requirements	Frequent, with higher risk of failure	Reduced, with predictive maintenance capabilities
Manufacturing techniques	Traditional casting and machining	CAD, FEA, additive manufacturing
Weight	Standard weight, no optimization	20% lighter due to advanced materials and design
Fatigue resistance	Moderate, lower in high-pressure environments	20% improvement, critical for reliability

technology. The use of computer-aided design (CAD) and finite element analysis (FEA) has allowed engineers to optimise valve designs for better flow characteristics, reduced weight and improved durability (Zhang & Li, 2024). Additive manufacturing (AM), or 3D printing, is another significant development, enabling the production of complex valve components that are lighter yet stronger than those produced through traditional manufacturing methods. This has resulted in ball valves that are not only more efficient but also more reliable in operation (Chen & Zhao, 2024). In particular, 3D-printed valve components have shown a 20% improvement in fatigue resistance, which is

crucial for the long-term reliability of valves in high-pressure environments like LNG and CNG stations (Chen & Zhao, 2024).

Automation and smart valve technologies

The integration of automation and smart technologies into ball valves has revolutionised their operation in LNG and CNG stations. Modern ball valves are now equipped with sensors and actuators that enable real-time monitoring and remote control, greatly enhancing operational efficiency and safety (Harris & White, 2023). Smart valves can detect and respond to changes in flow, pressure and temperature automatically, reducing the risk of human error and improving overall system reliability. Studies have shown that the implementation of smart valve technology can reduce maintenance costs by up to 15% and decrease unplanned downtime by 20% (Lee & Kim, 2023). Additionally, the use of predictive maintenance algorithms, powered by data from smart valves, allows operators to anticipate and address potential issues before they lead to costly failures (Harris & White, 2023). This proactive approach not only extends the lifespan of the valves but also ensures that LNG and CNG stations operate at peak efficiency.

Comparative analysis: traditional vs. advanced ball valve technologies

The table below compares traditional ball valve technologies with the latest



Figure 2. Ball valves built for longevity and performance in harsh LNG and CNG conditions



Figure 3. Optimised valve design for reliable performance in gas stations

advancements in various key aspects relevant to LNG and CNG applications.

Lifecycle cost analysis

The lifecycle costs of ball valves have also been significantly reduced due to these technological advancements. Traditional ball valves often require frequent maintenance and replacement due to wear and tear, particularly in the harsh environments of LNG and CNG stations. However, the use of advanced materials and smart technologies in modern ball valves has resulted in a 25% reduction in maintenance costs and a 20% extension in valve lifespan (Lee & Kim, 2023). The table below provides a comparative analysis of lifecycle costs between traditional and advanced ball valves.

Environmental impact and sustainability

The advancements in ball valve technology also contribute significantly to

Cost aspect	Traditional ball valves	Advanced ball valves
Initial purchase cost	Lower	Higher
Maintenance frequency	High (every 2-3 years)	Low (every 4-5 years)
Replacement costs	Higher (frequent replacements)	Lower (extended lifespan)
Operational downtime costs	Higher due to frequent issues	Lower due to predictive maintenance
Total lifecycle cost	High	25% Lower

environmental sustainability. The reduced leakage rates and improved sealing technologies minimise the emission of methane, a potent greenhouse gas, from LNG and CNG stations. Studies have shown that the implementation of advanced ball valves can reduce methane emissions by up to 30%, aligning with global efforts to combat climate change (Garcia & Martinez, 2024).

Furthermore, the use of additive manufacturing in valve production reduces material waste by approximately 20%, contributing to more sustainable manufacturing practices (Zhang & Li, 2024). The integration of smart technologies also supports more efficient energy use in valve operation, reducing the overall carbon footprint of LNG and CNG stations (Harris & White, 2023).

Case study of the implementation of advanced ball valves in LNG stations

In 2023, a major LNG station operator in Asia implemented advanced ball valve technologies across its facilities to improve efficiency and reliability. The operator replaced outdated carbon steel valves with new duplex stainless steel valves equipped with smart automation features.

Outcomes:

- **Efficiency gains:** The station reported a 15% improvement in operational efficiency due to the reduced leakage rates and enhanced flow control provided by the new valves (Smith & Jones, 2023).
- **Cost savings:** Maintenance costs were reduced by 20% due to the predictive maintenance features enabled by smart valve technology (Lee & Kim, 2023).
- **Environmental impact:** The enhanced sealing technology significantly reduced methane emissions, contributing to the operator's sustainability goals (Garcia & Martinez, 2024).
- **Reliability:** The station experienced a 25% reduction in unplanned downtime, further improving its operational reliability (Evans & Brown, 2023).

This case study demonstrates the tangible benefits of adopting advanced ball valve technologies in LNG applications, highlighting their role in maximising efficiency and ensuring safe operations.

Conclusion

The evolution of ball valve technology is playing a critical role in enhancing the efficiency and reliability of LNG and CNG stations. Through advancements in materials, sealing technologies, manufacturing techniques and the integration of smart technologies, modern ball valves offer significant improvements over traditional designs. As the demand for cleaner energy sources continues to grow, these innovations will be essential in ensuring that LNG and CNG stations operate safely, efficiently and sustainably. ■



Figure 4. Automated ball valves with smart technology for real-time monitoring and control

About Batu Valve Türkiye

Batu Valve Türkiye is a manufacturer of advanced valve solutions for Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG) applications. The company offers innovative ball valves designed to enhance efficiency, durability and reliability in high-pressure environments. Batu Valve's products meet the demanding needs of LNG and CNG stations, ensuring safe and sustainable operations in the global energy infrastructure. Explore more at www.batuvalve.com.