Type BV2003
Trunnion Mounted Ball Valve

VORTUNA

Application

Tight-closing ball valve for process engineering and industrial applications
Nominal size NPS 16 to NPS 56
Nominal pressure Class 150 to Class 1500
Temperatures −10 to 200 °C

Body material
- Carbon Steel
- Stainless Steel

Ball material
- Stainless steel

Further features

- Design Standard: API 6D, ASME B 16.34
- Test and inspection: API 598, API 6D
- Face-to-face dimensions according to API 6D, ASME B16.10
- Flanged Ends: ASME B 16.5
- Exchangeable PTFE seat rings
- Blow-out proof ball shaft with spring-loaded PTFE V-ring packing
- TA-Luft (German clean air act) equivalent certification

Ball valve made of corrosion-resistant materials equipped with
- Pneumatic actuator or
- Manual actuator

The ball valves with pneumatic actuators can be equipped with positioners, limit switches and solenoid valves.

Leakage rate acc. to IEC 60534-4 or ANSI/FCI 70-2: IV,V

Fig. 1: Type BV2003 Ball Valve with Manual Actuator

Other Versions

– Body, ball and ball stem made from TITANIUM (TA1, TA2), Nickel (N6t N201), HASTELLOY (B,C), INCOLOY (800,825,903), MONEL (400,500), INCONEL (625,690),ZIRCONIUM 702, 904L, 20# Alloy, S32750 (SAF2507, F53), S31803 (SAF2205, F51), F55 (S32760), F60 (S32205), A4,C4 or other materials

– Ball valves for higher temperatures

– Ball valves for low temperatures

– Fire-safe versions according to API 607/6FA

– Others on request

Anti blow out stem

Our ball valves are always provided with anti-blow out stem design, which ensures total safety and integrity.

Full bore

Ball valves are generally designed so that internal flow passage is large enough to pass flow without a significant restriction. The diameter of the bore is the same as the diameter of the pipe to which it connects.

Reduced bore

Often, a system does not expected to operate at the full capacity of the pipe. This offers an opportunity for reducing equipment costs.
A reduced bore ball valve uses a ball/seat combination which has a smaller diameter than the pipe. The nominal valve size is referred to by the outlet size x the ball diameter — for example 3” x 2”.

Soft seated ball valves

The seat design features a deep pocket with a protective lip which makes the design a long lasting design. The seat assembly consists in an outer metallic seat carrier with a soft seat insert. The soft insert is located into a groove in the metallic seat carrier.
The complete seat assembly is floating inside valve body and it is energized by a set of springs which load the seat assembly against the ball preventing leakage from behind the seat.
Seat assembly is provided with outer o-ring to avoid leakage through the seat carrier and a graphite back up ring which ensure the tightness in case the o-ring is damaged.

Metal seated ball valves

Metal to metal sealed design has been employed perfectly for the ball and seat, which has also adopted the advanced hardening technologies, such as ultro-sonic spray coating, nickel base spray welding, surface specially hardening, stellite spray welding, ceramic material with high strength and hardness, and so on. Surface hardness of the ball and seat may generally reach more than HRC60, Maximum is up to HRC74, and application temperature of the material may be up to 540°C, Maximum is 980°C.

Principle of operation

The process medium can flow through the ball valve in both directions. The ball with its cylindrical bore (ball channel) rotates around the center axis. The rotary angle of the ball determines the flow rate across the free area between the body and the ball channel. The ball shaft, can be optionally connected to a pneumatic actuator or equipped with a manually operated lever actuator. The ball is sealed by means of exchangeable seat rings.
The ball shaft is sealed with PTFE/Flexible graphite ring packing.

Additional equipment and accessories:

The ball valve, following accessories can be used individually or in combination
– Pneumatic actuator
– Limit switch
– Various solenoid valves
– Supply pressure regulator
– According to user specifications can provide other attachments

Fail-safe position

Depending on the different initial install position of in the pneumatic actuators, the ball valve has two fail-safe positions, which become automatically close or open when the supply air fails:

Control valve CLOSED without supply air

The ball valve closes when the air supply fails.
The ball valve opens when the air supply increases to against the force of the springs.

Control valve OPEN without supply air

The ball valve opens when the air supply fails.
The ball valve closes when the air supply increases to against the force of the springs.

Table 1: *Main Parameter Specification*

Nominal size	NPS	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
Nominal pressure	Class	150 to 1500										
Design and Manufacture		API6D,ASME,B16.34,API608,MSS-SP-72(BS5351)										
Face to Face Dimension		ASME B16.10,API6D										
Connection Dimension		ASME B16.5										
Test and Inspection		API 598.API 6D										
Fire-Safe Design		API 607/6FA										
Temperature range	℃	-10℃ to 200℃										
Leakage		according to ANSI/FCI 70-2										
Valve plug	Soft seal	VI										
	Metal seal	IV										

Table 2: *Bill of Material*

Table 2.1: *2" -4"*

No.	Designation	Material
1	Adapter	A216-WCB,WCC,A352-LCB,A351-CF8,CF8M,CF3,CF3M,CN7M,CF8C,CD4MCu,CN-3MN
2	Ball	A105+ENP,A182 F6,F304,F304L,F316,F316L,F321,F51,F53,ALLOY-20
3	Sealing ring	FLEXIBLE GRAPHITE
4	Seat ring	A105+ENP,A182 F6,F304,F304L,F316,F316L,F321,F51,F53,ALLOY-20
5	Spring	SS304,INCONEL
6	Bearing	1045+RPTFE,SS304+RPTFE
7	Stuffing box	A105+ENP,A182 F6,F304,F304L,F316,F316L,F321,F51,F53,ALLOY-20
8	Sealing ring	SS304,SS316+FLEXIBLE GRAPHITE SPIRAL WOUND
9	Stem	A105+ENP,A182 F6,F304,F304L,F316,F316L,F321,F51,F53,ALLOY-20
10	Screw	1035,STAINLESS STEEL
11	Pin	AISI 1566
12	Key	1045
13	Connecting plate	1025,A216 WCB,A351 CF8
14	Packing	FLEXIBLE GRAPHITE
15	Oil cup	1025,SS304
16	Grease filitting	1025,SS304,SS316,SS304L,SS316L,SS321,ALLOY-20,F51,F53
17	O-Ring	VITON
18	O-Ring	NBR,VITION
19	Thrust Washer	PTFE
20	Sealing ring	PTFE,RPTFE,NYLON,PEEK,PPL,POM,KARBATE,MOLON,DEVLON
21	O-Ring	VITON
22	Nut	A194-2H,2HM,8,8M
23	Bolt	A193-B7,B7M,B8,B8M
24	Gasket	SS304,SS316+FLEXIBLE GRAPHITE SPIRAL WOUND
25	O-Ring	NBR,VITION
26	Screw	1035,STAINLESS STEEL
27	Trunnion	1045+ENP,A182-F6,F304,F316,F304L,F316L,F321,F51,F53,ALLOY-20,4140+ENP,17-4PH
28	Body	"Carbon Steel,Stainless Steel, TITANIUM(TA1,TA2),Nickel(N6,N201). HASTELLOY(B,C),INCOLOY(800,825,903),MONEL(400,500). INCONEL(625,690),ZIRCONIUM 702,904L,20#Alloy,S32750(SAF2507,F53). S3 1803(SAF2205,F51),F55(S32760),F60(S32205),A4,C4"
29	Adujsting ring	PTFE
30	Drain valve and plug	1025,SS304,SS316,SS304L,SS316L,SS321,ALLOY-20,F51,F53

Table 2.2: *6" and Above*

No.	Designation	Material
1	Adapter	A105,A350-LF2,A182-F304,F316,F304L,F316L,F321,F51,F53
2	Ball	A105+ENP,A350-LF2+ENP,A182-F6,F304,F304L,F316,F316L,F321,F51,F53
3	Sealing ring	FLEXIBLE GRAPHITE
4	Seat ring	A105+ENP,A182-F6,F304,F304L,F316,F316L,F321,F51,F53
5	Spring	SS304,INCONEL
6	Bearing	1045+RPTFE,SS304+RPTFE
7	Stuffing box	A105+ENP,A182-F6,F304,F304L,F316,F316L,F321,F51,F53
8	Sealing ring	SS304,SS316+FLEXIBLE GRAPHITE SPIRAL WOUND
9	Stem	1045+ENP,A182-F6,F304,F316,F304L,F316L,F321,F51,F53,ALLOY-20,4140+ENP,17-4PH
10	Grease filitting	1025,SS304,SS316,SS304L,SS316L,SS321,ALLOY-20,F51,F53
11	Screw	1035,STAINLESS STEEL
12	Pin	AISI 1566,STAINLESS STEEL
13	Key	1045
14	Connecting plate	1025,A216 WCB,A351 CF8
15	Packing	FLEXIBLE GRAPHITE
16	Oil cup	1025,SS304
17	O-Ring	VITON
18	O-Ring	NBR,VITION
19	Thrust Washer	PTFE
20	Sealing ring	PTFE,RPTFE,NYLON,PEEK,PPL,POM,KARBATE,MOLON,DEVLON
21	O-Ring	VITON
22	Nut	A194-2H,2HM,8,8M
23	Bolt	A193-B7,B7M,B8,B8M
24	Gasket	SS304,SS316+FLEXIBLE GRAPHITE SPIRAL WOUND
25	O-Ring	NBR,VITION
26	Adujsting ring	PTFE
27	Trunnion	1045+ENP,A182-F6,F304,F316,F304L,F316L,F321,F51,F53,ALLOY-20,4140+ENP,17-4PH
28	Screw	1035,STAINLESS STEEL
29	Body	A105,A350-LF2,A182-F304,F316,F304L,F316L,F321,F51,F53
30	Drain valve and plug	1025,SS304,SS316,SS304L,SS316L,SS321,ALLOY-20,F51,F53

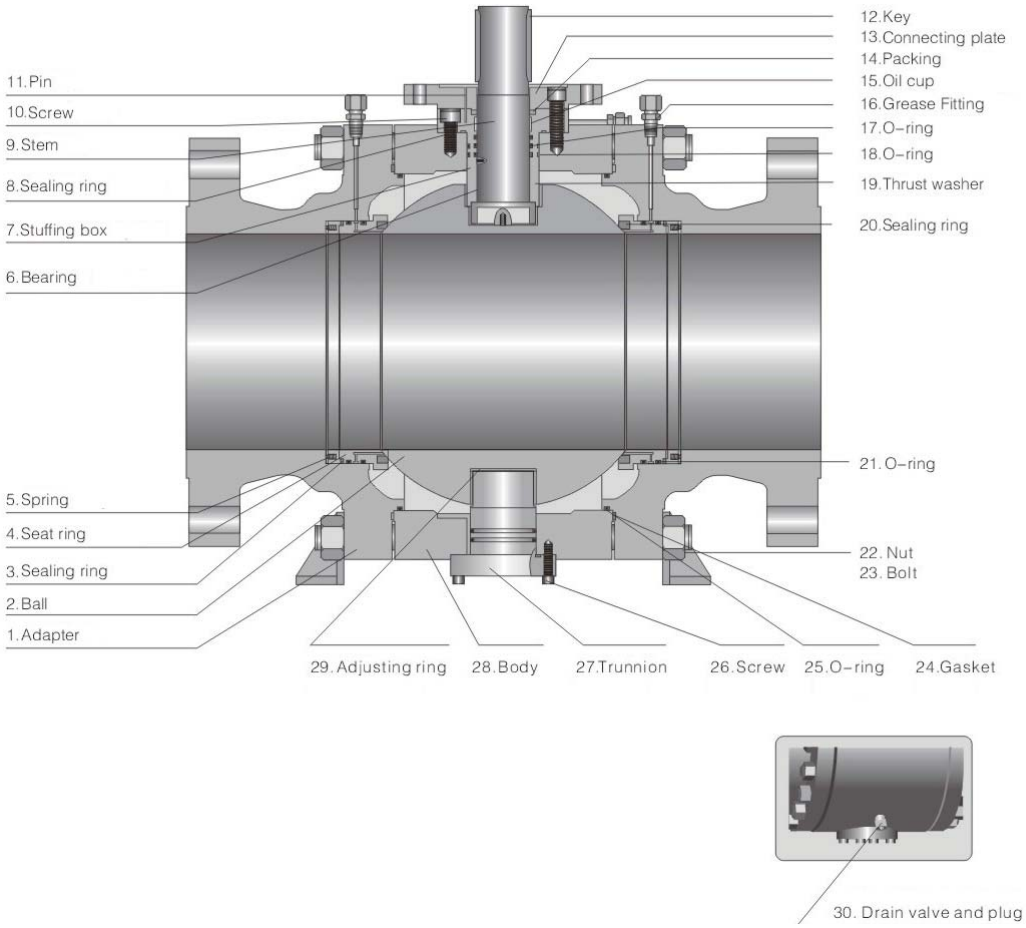

Fig.2 3PC Full Bore Floating Ball Valve Major Features of Type BV2003

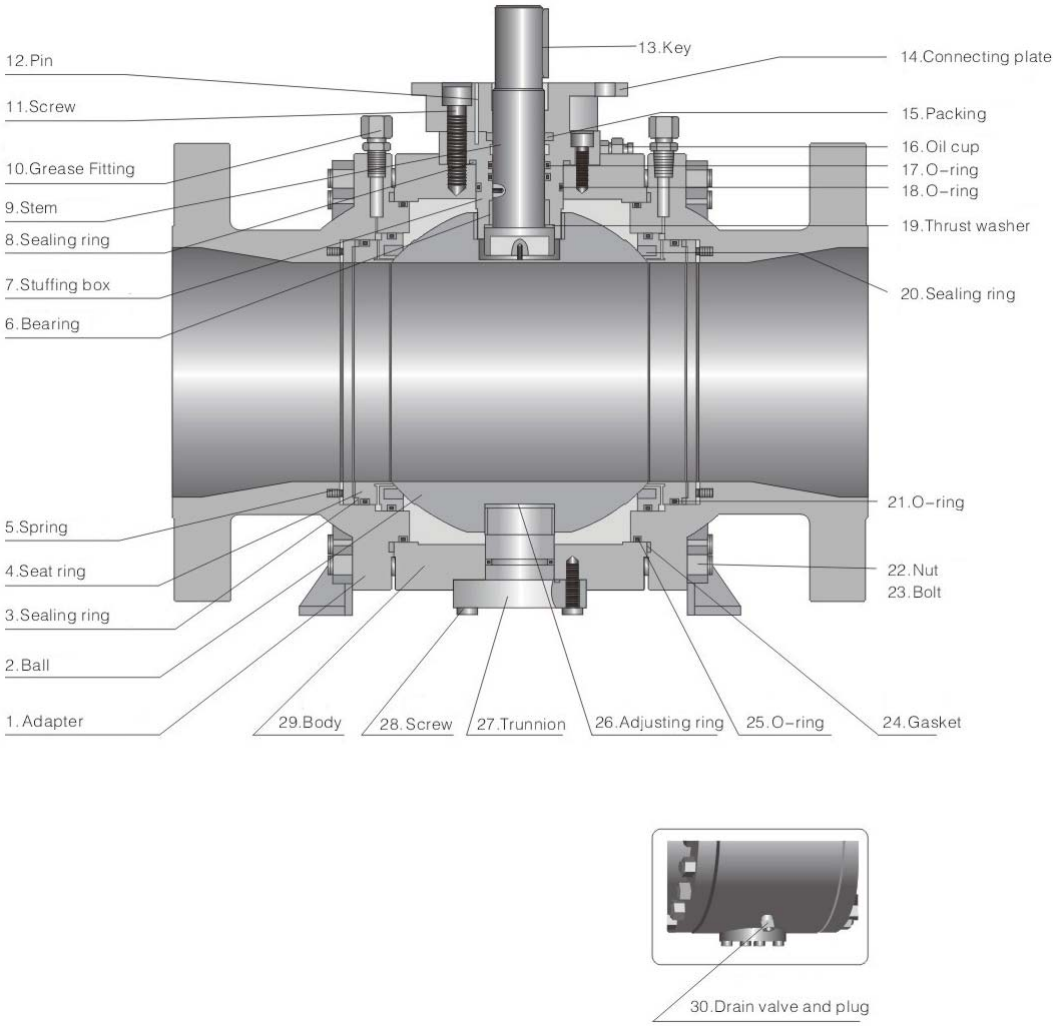

Fig.4 3PC Reduced Bore Floating Ball Valve Major Featuresof Type BV2003

Table 3: *Dimensions in mm for standard version of Type BV2003*
Table 3.1: *Class 150 LB*

SIZE(in)	L(RF)(mm)	L(RTJ)(mm)	L(BW)(mm)	H≈(mm)	H1≈(mm)	M≈(mm)	E≈(mm)	W I≈(mm)	W II≈(mm)
16	762	775	838	498	398	450	430	739	723
18x16 G	864	876	914	498	398	450	430	812	773
20x16 G	914	927	991	498	398	450	430	906	863
18	864	876	914	640	437	500	510	930	879
20x18 G	914	927	991	640	437	500	510	1029	980
20	914	927	991	700	467	550	530	1617	1540
24x20 G	1067	1080	1143	700	467	550	530	1900	1810
22	※991	-	※1092	735	499	550	530	2518	2398
24x22 G	1067	1080	1143	735	499	550	530	2591	2468
24	1067	1080	1143	820	551	550	530	2787	2654
30x24 G	1295	-	1397	820	551	550	530	3049	2904
26	1143	-	1245	892	624	550	530	3276	3120
28x26 G	1245	-	1346	892	624	550	530	3557	3388
28	1245	-	1346	901	632	550	530	3183	3032
30x28 G	1295	-	1397	901	632	550	530	3518	3350
30	1295	-	1397	962	715	762	-	3675	3350
32x30 G	1372	-	1524	962	715	762	-	-	-
36x30 G	1524	-	1727	962	715	762	-	3885	3700
32	1372	-	1524	1045	755	812	-	4725	4500
34	1473	-	1626	1095	785	812	-	6073	5784
36	1524	-	1727	1117	836	914	-	7237	6892
40	※1753	-	※1956	1285	900	914	-	9347	8902
42	※1855	-	※2083	1330	935	914	-	10355	9862
48	※2134	-	※2388	1434	1050	914	-	16210	15438
56	※2489	-	※2489	1476	1306	1016	-	25822	24592

G:Regular bore; ® :Reduce bore; W:The W in the table means weight of RF End Ball Valve

Table 3.2: *Class 300 LB*

SIZE(in)	L(RF)(mm)	L(RTJ)(mm)	L(BW)(mm)	H≈(mm)	H1≈(mm)	M≈(mm)	E≈(mm)	W I≈(mm)	W II≈(mm)
16	838	854	838	538	398	500	510	1330	1267
18x16 G	991	1010	991	538	398	500	510	1414	1347
20x16 G	991	1010	991	538	398	500	510	1538	1465
18	914	930	914	625	437	500	510	1602	1526
20x18 G	991	1010	991	625	437	500	510	1739	1656
20	991	1010	991	712	477	500	510	1966	1872
24x20 G	1143	1165	1143	712	477	500	510	2365	2252
22	1092	1114	1092	799	495	550	530	2517	2397
24x22 G	1143	1165	1143	799	495	550	530	3215	2507
24	1143	1165	1143	826	585	550	530	3158	3008
30x24 G	1397	1422	1397	826	585	550	530	3945	3758
26	1245	1270	1245	862	630	550	530	3620	3416
28x26 G	1346	1372	1346	862	630	550	530	3776	3596
28	1346	1372	1346	893	683	550	530	4061	3868
30x28 G	1397	1422	1397	893	683	550	-	4261	4058
30	1397	1422	1397	968	715	762	-	5223	4974
32x30 G	1524	1553	1524	968	715	762	-	-	-
36x30 G	1727	1756	1727	968	715	762	-	6281	5982
32	1524	1553	1524	1008	785	812	-	5958	5674
34	1626	1654	1626	1073	836	914	-	6913	6584
36	1727	1756	1727	1100	875	914	-	7944	7566
40	※1956	-	※1956	1245	923	914	-	10117	9635
42	※2083	-	※2083	1345	958	914	-	11425	10881
48x42 G	※2170	-	※2170	1345	958	914	-	-	-
48	※2170	-	※2170	1490	1108	914	-	18467	17558

G:Regular bore; ® :Reduce bore; W:The W in the table means weight of RF End Ball Valve

Table 3.3: *Class 600 LB*

SIZE(in)	L(RF)(mm)	L(RTJ)(mm)	L(BW)(mm)	H≈(mm)	H1≈(mm)	M≈(mm)	E≈(mm)	W I≈(mm)	W II≈(mm)
16	991	994	991	643	416	500	510	1549	1475
18x16 G	1092	1095	1092	643	416	500	510	1695	1615
20x16 G	1194	1200	1194	643	416	500	510	1778	1692
18	1092	1095	1092	723	455	500	510	1828	1741
20x18 G	1194	1200	1194	723	455	500	510	1935	1843
20	1194	1200	1194	823	522	550	530	2320	2210
24x20 G	1397	1407	1397	823	522	550	530	3235	3081
22	1295	1305	1295	845	592	812	-	3899	3714
24x22 G	1397	1407	1397	845	592	812	-	4057	3864
24	1397	1407	1397	866	615	812	-	3665	3490
30x24 G	1651	1664	1651	866	615	812	-	4270	4496
26	1448	1461	1448	924	630	812	-	4751	4525
28x26 G	1549	1562	1549	924	630	812	-	-	-
28	1549	1562	1549	956	700	812	-	5405	5148
30x28 G	1651	1664	1651	956	700	812	-	-	-
30	1651	1664	1651	1038	726	914	-	6056	5768
32x30 G	1778	1794	1778	1038	726	914	-	-	-
36x30 G	2083	2099	2083	1038	726	914	-	7415	7062
32	1778	1794	1778	1218	788	914	-	7253	6908
34	1930	1946	1930	1230	815	914	-	7778	7408
36	2083	2099	2083	1269	875	914	-	9128	8745
40	※2337	※2337	※2337	1342	945	914	-	12584	11985
42	※2437	※2437	※2437	1520	989	1016	-	14805	14100
48x42 G	※2540	※2540	※2540	1520	989	1016	-	18779	17885
48	※2540	※2540	※2540	1655	1120	1016	-	22699	21618

G:Regular bore,®:Reduced bore,W:The W in the table means weight of RF End Ball Vall
※L:will be confirmed by the consumer and factory

Table 3.4: *Class 900 LB*

SIZE(in)	L(RF)(mm)	L(RTJ)(mm)	L(BW)(mm)	H≈(mm)	H1≈(mm)	M≈(mm)	E≈(mm)	W I≈(mm)	W II≈(mm)
16	1130	1140	1130	727	406	550	530	1998	1903
18x16 G	1219	1232	1219	727	406	550	530	2155	2050
20x16 G	1321	1334	1321	727	406	550	530	2495	2374
18	1219	1232	1219	785	418	550	530	2415	2300
20x18 G	1321	1334	1321	785	418	550	530	2730	2600
20	1321	1334	1321	839	561	550	530	3135	2985
24x20 G	1549	1568	1549	839	561	550	530	3895	3708
24	1549	1568	1549	853	634	812	-	5295	5040
30x24 G	1880	※1902	※1880	853	634	812	-	7200	6850
26	※1651	※1674	※1651	909	725	914	-	6365	6060
28x26 G	※1753	※1775	※1753	909	725	914	-	-	-
28	※1753	※1775	※1753	980	765	914	-	7635	7270
30x28 G	※1880	※1902	※1880	980	765	914	-	-	-
30	※1880	※1902	※1880	1095	810	914	-	8846	8425
32x30 G	※2032	※2054	※2032	1095	810	914	-	-	-
36x30 G	※2286	※2315	※2286	1095	810	914	-	10778	10265
32	※2032	※2054	※2032	1270	840	914	-	10068	9589
34	※2159	※2188	※2159	1310	860	914	-	14250	13545
36	※2286	※2315	※2286	1445	893	914	-	15372	14640

G:Regular bore,®:Reduced bore,W:The W in the table means weight of RF End Ball Vall
※L:will be confirmed by the consumer and factory

Table 3.5: *Class 1500 LB*

SIZE(in)	L(RF)(mm)	L(RTJ)(mm)	L(BW)(mm)	H≈(mm)	H1≈(mm)	M≈(mm)	E≈(mm)	W I≈(mm)	W II≈(mm)
16	1384	1407	1384	650	500	550	530	3718	3540
18x16 G	※1537	※1559	※1537	650	500	550	530	4720	4496
20x16 G	※1664	※1686	※1664	650	500	550	530	5020	4781
18	※1537	※1559	※1537	783	585	812	-	5065	4824
20x18 G	※1664	※1686	※1664	783	585	812	-	6392	6088
20	※1664	※1686	※1664	880	635	914	-	7612	7250
24x20 G	※2043	※2071	※2043	880	635	914	-	8737	8321
24	※2043	※2071	※2043	1285	720	914	-	11387	10845

G:Regular bore,®:Reduced bore,W:The W in the table means weight of RF End Ball Vall
※L:will be confirmed by the consumer and factory

Selecting and sizing the ball valve:

Accordance with ball valve operation and design conditions:

– Calculate the required nominal size, on-off valve generally based on user pipe size to calculate diameter of the valve.

– Select the suitable materials from Table 2.

– Select accessories.

Ordering text:

Ball valve	Type BV2003
Nominal size	DN ...
Nominal pressure	PN ...
Type of end connections	Flanges
Leakage rate	
On option, special version	
Actuator Type	Pneumatic rotary actuator or Manual lever
Fail-safe position	Fail-close or Fail-open
Signal pressure	... bar
Accessories	Limit switch, Solenoid valve, Supply pressure regulator
Operating pressure	... bar
Medium temperature	... °C
Sealing type	…Soft or Metal
Others	

Specifications subject to change without notice