KOFLOW

BALL VALVES

Ball Valve Model Schedule Illustration

1 2 3 4 5 6 7 8

① Codes of Nominal Diameter

British series indicated by A××in value, and metric series indicated by G××mm value.

② Codes of Driving Modes (For handle or lever drive, this code can be omitted.)

3—Manual Operator; 6—Pneumatic; 6S—Pneumatic Spring Return; 6A—Pneumatic Control; 5—Gear Drive; 7—Hydraulic; 8—Airdraulic; 8H—Airdraulic with Emergency Cutoff; 9—Electric

③ Codes of Valve Types

FB-Float Ball Valve; TB-Fixed Ball Valve

④ Codes of Nominal Pressure Class

1—PN1.6 class150 ; 2—PN2.5; 3—class300; 4—PN4.0 class400 ; 6—PN6.4 class600

9—class900; 10—PN10.0; 15—class1500; 16—PN16.0; 20—PN20.0; 25—class2500;

⑤ Codes of Connecting Modes

RF—Raised Face Flange; FF—Fully Flat Face Flange; MFM—Male and Female Flange; TG—Tongued and Grooved Flange; RJ—Ring Junction Flange; BW—Butt Welding; SW—Socket Welding; NPT—Threaded Connection

⑥Codes of Structural Modes

1—Full Bore Straightway; 2—Reducing Straightway; 3T—T-shaped Three-Way; 3L—L-shaped Three-way; 4—Four-way; 5—Overall Top Installed (Full Bore); 5A—Overall Top Installed (Reducing); 6—Track Ball Valve (Full Bore); 6A—Track Ball Valve (Reducing); 7H—Eccentric Half Ball; 7F—Eccentric Full Ball; 8—All Welded (Full Bore); 8A—All Welded (Reducing)

⑦ Codes of Shell Materials

C—WCB; C5—C5; C6—WC6; C9—WC9; BL—LCB; CL—LCC

8—CF8; 8M—CF8M; 3—CF3; 3M—CF3M; ML—MONEL

⑧ Codes of Ball Materials

1—WCB; 2—CF8; 3—CF8M; 4—CF3; 5—CF3M

1F—A105or25 2F—304; 3F—316; 4F—304L; 5F—316L

⑨ Codes of Seat Materials

F—PTFE; N—Nylon; G—Carbon Fiber; P—PPL; E—PEEK; M—MOLON

Note:* The letters of " K " 、 " E " 、 " O " and " J " are placed in front of the codes of valve types, respectively representing hydrogen sulphide resistant, extension bar, oxygen, and jacketed ball valve.

Example: A8 " TB3RF1C2F means API 8 " worm gear drive, fixed ball valve, 300Lb, raised face flange, full bore, body material WCB, ball material CF8, and seat of F4.

*** The figures mentioned hereunder don't have the codes of caliber and valve material, they are to be specified by users.**

Technical Specifications of Ball Valve

Technical Specifications	API Series	GB Series
Design Specifications	API6D、API608、BS5351	GB/T12237、JB/T7745
Pressure and Temperature Class	ASME B16.34	GB/T9124
Face-to-face	ASME B16.10	GB/T12221、GB/T15188.1
Flange Type and Dimensions	ASME B16.5 、ASME B16.47	GB/T9113 、JB/T79
Butt Welded	ASME B16.25	GB/T12224
Socket Welded	ASME B16.11	/
Threaded	ASME B16.1.20	/
Inspection and Test	API598 、API6D	JB/T9092、GB/T13927
Fireproofing Test	API6FA 、API607	JB/T6899-1993
Quality Inspection of Cast Steel Body	MSS -SP-55	JB/T9092-1999

HARD SEALING BALL VALVE

Introduction to Hard Sealing Ball Valve

The metal hard sealing abrasion-resistance ball valve, a distinctive product researched and developed by our company, is applicable for tough working conditions like high impurity, viscosity, temperature and pressure as well as strong corrosion. It adopts reasonable, applicable and high-quality materials, brand-new design concept, advanced production and processing procedures, and whole-process quality control to make every valve satisfied by customers. It has been widely applied in such industries as petrochemical (PE, PP, He-catalytic cracking, ethylene, synthetic resin, silicon powder, etc.); water drainage of main steam pipeline in power plant; coal powder, deslagging and desulfuration of steel mill; high-pressure melting and slurry filtering system in alumina plant; and coking coal to oil transfer.

Characteristics of Hard Sealing Ball Valve

Brand-new Design Concept

Our company adopts different valve designs in accordance with different working conditions:

1. The valve seat and ball sealing surface adopt the metal to metal seal while its ball and seat adopt the special hardening treatment to ensure reliable seal, resistance to high temperature, abrasion and corrosion and a long service life. Its ball and seat are provided with good cutting and self-cleaning functions, applicable for the control over media containing grains and fibers.

2. The seat adopts the plate or compression spring load so that it can avoid the jamming between its ball and seat caused by thermal expansion and cold shrinkage, especially in a state of high or low temperature, in which the flexible seat structure with the automatic compensation function is adopted so that the amount of deformation of its ball and seat can be absorbed by the plate or compression spring, thus it can be opened or closed freely in that state with the reliable seal.

3. Its seat seal can adopt the O-ring, graphite gasket or pretightening graphite seal in accordance with working conditions and temperature; these structure types can be adopted reasonably in accordance with actual working conditions to get a satisfactory result. Our hard sealing fixed ball valve adopts the pre-ball seal structure generally with double block and bleed functions (DBB structure) (see the above instructions for fixed ball valve for specific principle and structure). Generally the floating ball valve adopts the post-ball seat seal structure, which is a kind of one-way seal structure; the floating double-way seal structure can also be adopted in case of special requirements by users.

4. The stem seal of hard sealing ball valve adopts the flexible graphite packing while the flange adopts the flexible graphite with stainless steel wire or the metal twisted graphite gasket, thus boasting the functions of intrinsic safety for fire (conforming to API607) and electrostatic prevention (conforming to API608). It adopts the bottom-mounting and blowout-proof stem structure so as to avoid the blowout of stem caused by the valve misoperation.

Advanced Manufacturing Process

1. Supersonic Flame Spray Coating Process

Its ball surface adopts the surface heat spray coating plant---high velocity oxy-fuel (HVOF), whose process is:after the hydrogen and oxygen gases burn -fully and explode, the high-velocity flame, as high as 6,000 yards/s (triple velocity of sound),will be generated; then the metal powder particles (material selected in accordance with customer requirements)will be sprayed and coated on the ball surface and the seat sealing surface by means of a specially designed spraying gun to form a compact and very adhesive coating with a normal cohesive strength up to 70MPa and a maximum coating surface hardness up to HRC62-70,which is invulnerable to being scuffed by media or impurities in them. HVOF can make a perfect combination of hardness and strength, invulnerable to temperature effects.

2. "Paired" Precision Grinding Process

Our company can ensure the "paired" precision grinding between the ball and the seat of every valve. Due to a high solidity ratio between the valve's ball and seat, we adopt the unique grinding material, process and assembly to grind on the modified precision grinder with the zero-leakage sealing effect. We adopt the manual grinding mode for large-bore valves so that the quality of every valve can be ensured.

3. High-quality Sealing Material

It is an important factor for ensuring the valve operating performance to adopt the high-quality and reasonable seat sealing material. However, its characteristics can only be given play to on the premise of ensuring to understanding the working conditions and the medium. Therefore, we divide the hard sealing ball valve into four types according to our many years of supply experience and working places. See the applicable places for details.

HARD SEALING BALL VALVE

Technical Specifications of Product

Product Performance Specifications (Lb)

Performance Specifications		Mpa					CLASS						
		1.6	2.5	4.0	6.4	10.0	150	300	400	600	900	1500	2500
Test Pressure	Strength Test	2.4	3.75	6.0	9.6	15.0	2.93	7.58	10.0	15.0	22.5	37.5	63.0
	Seal Test	1.76	2.75	4.4	7.04	11.0	2.07	5.52	7.31	11.03	16.5	27.5	46.2
	Air Pressure Test	0.6 MPa											
Suitable Temperature		-196 ℃~550℃ (Note: different materials to be used to deal with different											
Suitable Medium		Water, steam, petroleum, LPG, natural gas, oxygen gas, corrosive medium, etc.											

Class: Class150 ~ 1500、PN1.6 ~ 10.0MPa
Nominal Diameter: DN15 ~ 900mm
Design and manufacture: API608、API 6D GB/T12237
Structural Length: ASME B16.10 GB/T12221
Connection type : 1、Flanged welded connection : ASME B16.5 ASME B16.47、GB/T9112 ~ 9131、JB/T79、 Sh3006、Hg20592 ~ 20635
2、butt welded connection : GB/T12224 ASME B16.34
Pressure Test : API598、JB/T9092
Actuator mode: Manual、Worm Gear Drive、Pneumatic、Electric

Applicable Places of Hard Sealing Ball Valve

According to customers' needs, our company has developed series of metal hard sealing ball valves like low temperature, high-temperature and high-pressure steam cutoff, high corrosion resistance and high abrasion resistance, thus having enriched our product contents and features all the more and extended the market coverage and share of our products. At the same time our company has carved a niche for itself in the aspect of hard sealing ball valve technology.

1. The low temperature type is applied for the medium cutoff control in low-temperature places with the medium temperature to -196℃.Both its body and internal components have gone through the -196℃ liquid nitrogen low temperature treatment and it adopts the extended upper bonnet to ensure to be used normally in an ultralow-temperature state and achieve the zero leakage of gas.

2. The high corrosion resistance and high abrasion resistance hard sealing ball valves are mainly applied in the domestic coal to oil transfer and methanol projects. Of them, the pressure for oxygen cutoff in high-pressure places is 3.0～5.0MPa. Due to the particularity of the oxygen medium, the flow rate of oxygen must be controlled less than 25m/s, so special modifications have been made for the high-pressure oxygen cutoff metal hard sealing ball valve and its internal components adopt special alloy materials like MONEL to ensure the flow rate of oxygen controlled less than 25m/s and the zero leakage of gas to reach the national standard and working requirements of users on the moment the valve is opened. With the large-scale development of China's coal to oil transfer and methanol projects, the high-pressure oxygen cutoff valve has been used massively in such aspects, which had been imported from foreign valve manufacturers basically before that. Therefore, the successful development and application of high-pressure oxygen cutoff metal hard sealing valve has broken the situation of complete dependence on the import.

3. The high-temperature and high-pressure steam cutoff type is applied for the steam cutoff in a high-temperature and high-pressure state. Generally it can often be found on main steam drainage pipelines in large-scale petrochemical plants with temperature 300℃～500℃, pressure 3.0～5.0Mpa and valve diameter DN200～DN350. Due to such factors as high temperature, high pressure and large bore, our company has solved the problem of ball grinding of large-bore ball valves through our unique grinding technology to ensure it can be used normally in a high-temperature and high-pressure state and that the gas leakage can meet the technical requirement for zero leakage.

4. The high temperature type is applied for the medium cutoff control in high-temperature places with the medium temperature up to +650℃. Both its body and internal components adopt high temperature resistant special alloy steel with high-temperature treatment and it adopts the extended upper bonnet to ensure to be used normally in a high-temperature state and achieve the zero leakage of gas.

HARD SEALING BALL VALVE

Product Line

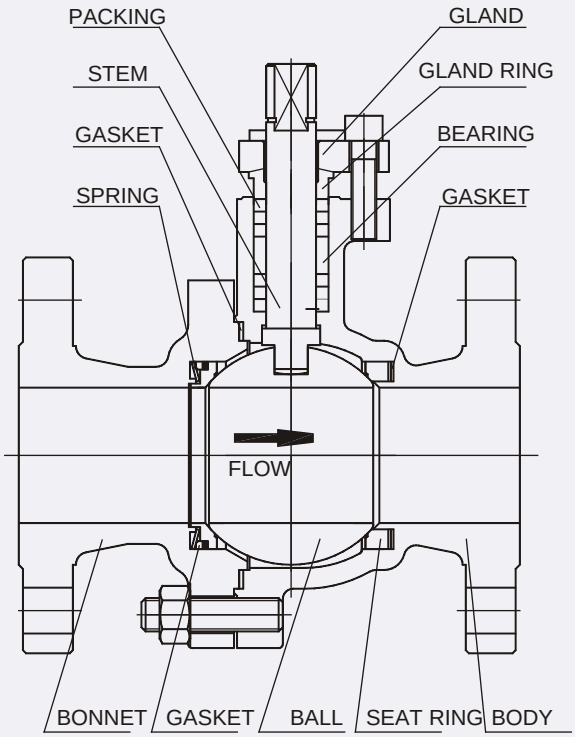
Nominal Diameter		PN(MPa)					Class						
DN	in	1.6	2.5	4.0	6.3	10.0	150	300	400	600	900	1500	2500
50	2	●/△					●/△					☆/△	
65	2 1/2	●/△					●/△					☆/△	
80×50	3×2	●/△					●/△					☆/△	
80	3	●/△					☆/△					☆/△	
100×80	4×3	●/△					●/△					☆/△	
100	4	●/△					●/△				☆/△		
125	5	●/△			●/☆/△	△	●/△		●/☆/△	△	—		
150×100	6×4	●/△					●/△				☆/△		
150	6	●/☆/△/★				☆/△/★	●/☆/△/★			☆/△/★	☆/△/★		
200×150	8×6	☆/△/★			●/☆/△/★		☆/△/★		●/☆/△/★		☆/△/★		
200	8	☆/△/★					☆/△/★						
250×200	10×8	☆/△/★					☆/△/★						
250	10	☆/△/★					☆/△/★						
300×250	12×10	☆/△/★					☆/△/★						
300	12	☆/△/★					☆/△/★						
350×300	14×12	☆/△/★					☆/△/★						
350	14	☆/△/★					☆/△/★						
400×300	16×12	☆/△/★					☆/△/★						
400	16	☆/△/★					☆/△/★						
450	18	☆/△/★					☆/△/★						
500×400	20×16	☆/△/★					☆/△/★						
500	20	☆/△/★					☆/△/★						
600×500	24×20	☆/△/★					☆/△/★						
600	24	☆/△/★					☆/△/★						☆/★
650	26	☆/△/★					☆/△/★					☆/★	—
700	28	☆/△/★					☆/△/★					☆/★	—
750×600	30×24	☆/△/★											—
750	30	☆/△/★				☆/★	☆/△/★			☆/★			—
800	32	☆/△/★				☆/★	☆/△/★			☆/★			—
850	34	☆/★					☆/★						—
900×750	36×30	☆/△/★					☆/△/★				☆/★		—
900	36	☆/★					☆/★						—

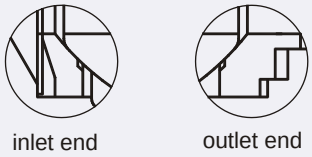
Note: 1、● stands for handle operated valves; ☆stands for gearbox operated valves;
△ stands for air operated valves; ★stands for electrically operated valves;
/ stands for no option of this.
Those not covered in the table can be custom made to users' requirements.

HARD SEALING BALL VALVE

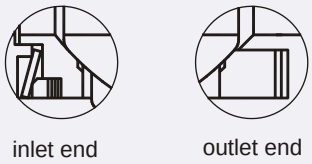
Valve Structural Diagram

Floating hard seal ball valve





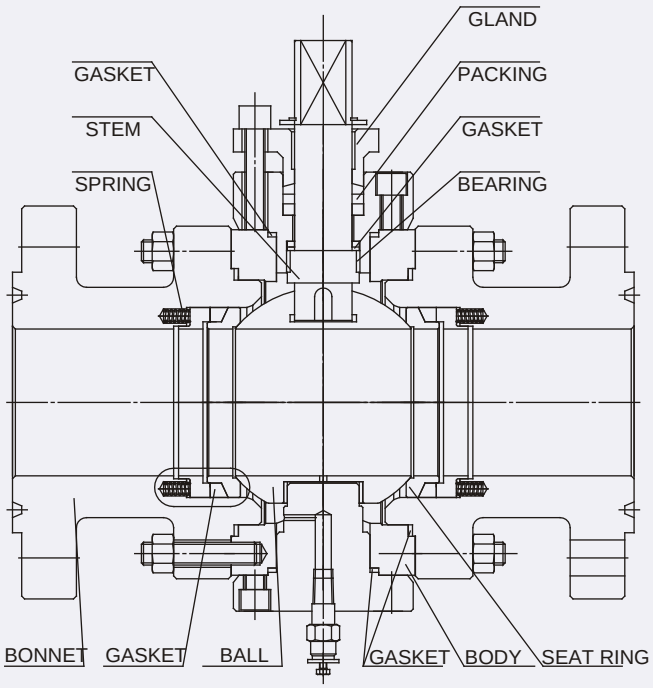
outlet seal



inlet/outlet seal

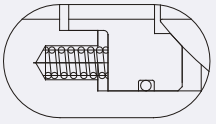
Seat structure type of floating hard sealing ball valve: outlet seal and inlet/outlet seal, subject to working conditions of customers.
Seat: SUS316/cobalt-base alloy
Gasket: graphite
Spring: 17-7PH or INCONEL 750
Temperature range: 196℃~400℃ or -196℃~650℃

Fixed hard seal ball valve



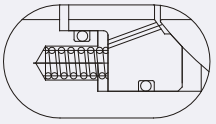
HARD SEALING BALL VALVE

Seat types of fixed hard seal ball valve mainly include the following



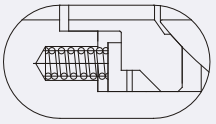
Inlet end seal

Seat Ring: SUS316/Cobalt based alloy
O Ring : Viton
Spring: 17-7PH
Temp. range: -40℃~200℃



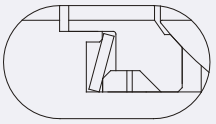
Inlet/outlet end end seal

Seat Ring: SUS316/Cobalt based alloy
O Ring : Viton
Spring: 17-7PH
Temp. range: -40℃~200℃ （Only used in cleanlily gas and liquids fluids）



Inlet end seal

Seat Ring: SUS316/Cobalt based alloy
Gasket : Graphite
Spring: 17-7PH or INCONEL 750
Temp. Range: -196℃~400℃ or -196℃~650℃



Inlet end seal

Seat Ring: SUS316/Cobalt based alloy
Gasket : Graphite
Spring: 17-7PH or INCONEL 750
Temp. Range: -196℃~400℃ or -196℃~650℃

Materials of Main Parts

Part Name	Materials
Body	A216 WCB、A351 CF8/CF8M、A352 LCB
Ball	SUS316/HCr、SUS316/STL、SUS316/CoCrW
Stem	SUS316、SUS630
Bearing	SUS316/HCr
Gasket	SUS316/HCr、SUS316/STL、SUS316/CoCrW
	SUS316 Spiral wound(SUS316+graphite)

Note: 1. Different materials for internal components can be adopted in accordance with different working conditions and customer requirements.
2. The working temperature is subject to internal components and sealing elements.

Main Overall and Connecting Dimensions and Weight

See the floating ball valve for main overall and connecting dimensions, flow coefficient and weight of metal hard sealing floating ball valve; and see the fixed ball valve for those of metal hard sealing fixed ball valve.

Operating Torque of Valve

Due to the difference of sealing materials of hard sealing ball valve, the friction factor differs a lot. Therefore, the operating torque of hard sealing ball valve is not given in this sample. Please ask our company for the operating torque of detailed specifications of valves.