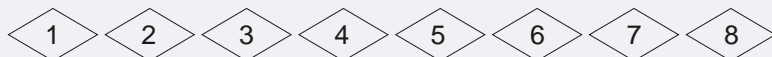


KOFLOW

BALL VALVES

Ball Valve Model Schedule Illustration



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

⑥ Codes 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

CRYOGENIC BALL VALVE

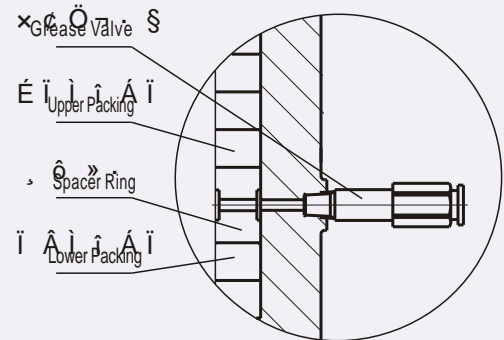
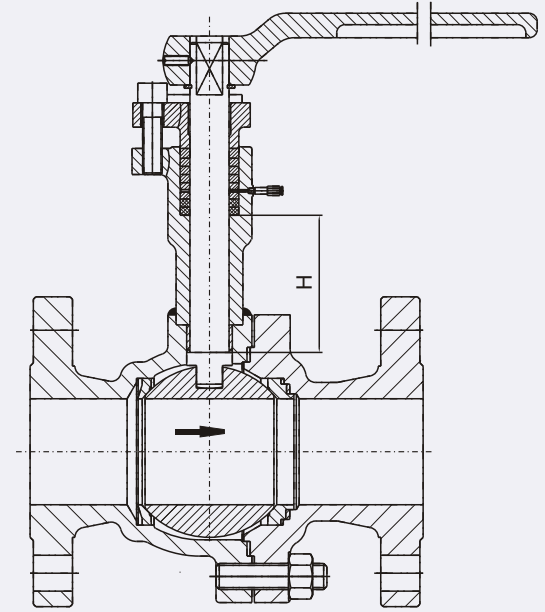
APPLICABILITY:

Cryogenic ball valves are mainly used in the chemical equipment of ethylene and LNG etc. to handle cryogenic liquid medium like ethylene, liquid oxygen, liquid hydrogen and so on. These types of inflammable and explosive medium can be volumetrically expanded by several hundred times when being gasified under temperature rise, and are difficult to manufacture due to their highly penetrative and leaky properties.

Structural Properties:

- 1、The materials of compression parts can endure the expansion and shrinkage resulted from the temperature variation of medium, and seal structure is away from permanent deformation under temperature changes. To work under the conditions below -100°C , the parts of valve shall be subject to deep cooling treatment before precision machining. Namely, have the parts cooled in liquid nitrogen box, when the temperature of parts reaches -196°C , keep the temperature for 1~2h, then take them out to have them to the normal temperature naturally, and do in this way twice.
- 2、Bonnet is shaped long-necked for the purpose to protect the function of packing box, making packing box somewhat away from low temperature to ensure good seal of packing. Besides, it can be wound with cold insulating materials to prevent loss of cold energy. The length of neck (H, see the drawing on the left) depends on service temperature and the thickness of cold insulating material. When the effect of packing seal turns lower, fill in grease to form up oil seal layer from the middle of packing box (see combined packing structure) to lower the differential pressure of packing box and enhance the dependability of seal.
- 3、To serve a temperature below -100°C , the material of valve stem shall be treated with chromeplating or nitriding to enhance the surface hardness of valve stem and the sealing dependability of packing.
- 4、Cryogenic ball valve takes a structure to avoid abnormal pressure rise. As the medium in low temperature valve is gasified and rapidly expanded in volume, the pressure will go extremely high. When the pressure in the middle cavity of valve rises, the middle cavity and the inlet side can be communicated, or a relief can be mounted at the inlet side of valve, thus to ensure the safe use of valves.
- 5、The gaskets used on low temperature ball valves may function dependable seal and restoration under normal and low temperature or under the conditions of temperature changes.

Structural Type:



Combined Diagram of Dual Packing
1/4

CRYOGENIC BALL VALVE

Manufacturing Specifications of Low Temperature Ball Valve:

Standard	API Series	GB Series
Basic Design Specifications	ANSI B16.34、JB/T7749	
Pressure-Temperature Rating	ANSI B16.34	GB/T12224
Structural Length	ASME B16.10	
Connecting Flange	ASME B16.5	GB/T9113/HG20596
Inspection & Test	API598*	JB/T9092*

Low temperature ball valves shall be subject to pressure test under low temperature after the pressure test under normal temperature, with its principle referred to the type drawing of low temperature ball valves.

Minimum Service Temperature of Cryogenic Materials for Ball Valve Body

Material	Minimum Service Temperature (°C)	Material	Minimum Service Temperature (°C)
ASTM A350 LF2	-45.6°C	ASTM A352 LCB、LCC	-46°C
ASTM A350 LF5	-59.4°C	ASTM A352 LC1	-59°C
ASTM A350 LF9	-73.3°C	ASTM A352 LC2	-73°C
ASTM A350 LF3	-101.1°C	ASTM A352 LC3	-101°C
ASTM A182 F304	-254°C	ASTM A351 CF8	-254°C
ASTM A182 F316	-254°C	ASTM A351 CF8M	-254°C
ASTM A182 F304L	-254°C	ASTM A351 CF3	-254°C
ASTM A182 F316L	-254°C	ASTM A351 CF3M	-254°C

Range of Supply

Nominal Diameter		Class
DN	in	150Lb、300Lb、PN1.6~10.0MPa
15	1/2	△/●
20	3/4	△/●
25	1	△/●
32	1 1/4	△/●
40	1 1/2	△/●
50	2	△/★/●
65	2 1/2	△/★/●
80	3	△/★/●
100	4	△/★/●
125	5	△/★/●
150	6	△/★/●
200	8	△/★/●
250	10	△/★/●
300	12	△/★/●
350	14	△/★/●
400	16	△/★/●

Length of Extended Bonnet of Cryogenic Valve (Reference)

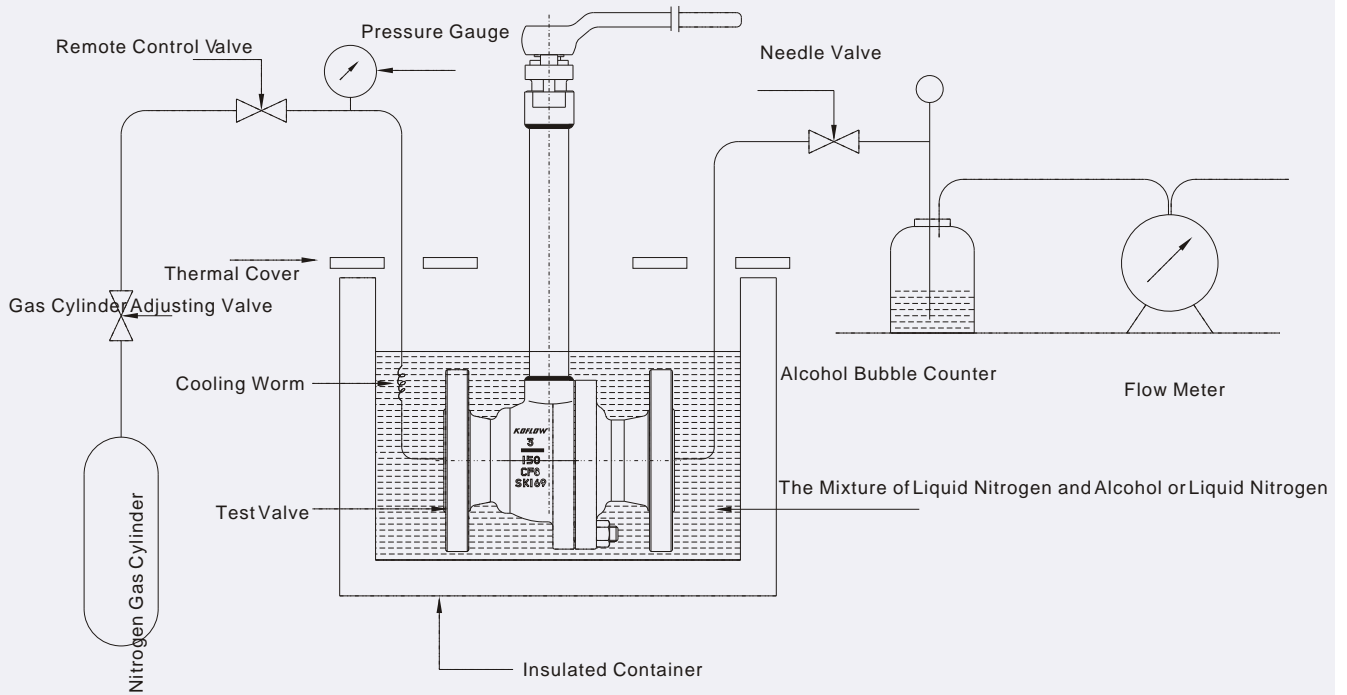
Nominal Diameter		Neck Length H (mm)		
DN	in	≥-60°C	≥-100°C	<-100°C
15	1/2	90	110	130
20	3/4	100	110	140
25	1	100	120	150
32	1 1/4	110	120	150
40	1 1/2	110	130	160
50	2	110	130	170
65	2 1/2	120	140	180
80	3	120	150	190
100	4	130	160	200
125	5	130	160	200
150	6	140	170	220
200	8	140	170	220
250	10	150	180	240
300	12	150	180	240
350	14	160	190	250
400	16	160	190	250

Note: ★ stands for electrically operated valves; △ stands for air operated valves;
 ● stands for hand operate d valves; — stands for no option of this.
 Those not covered in the table can be custom made to users' requirements.

Cryogenic BALL VALVE

Type Test of Cryogenic Ball Valves:

In accordance with the requirements of relative standards, the type test of cryogenic ball valves shall be carried out under both normal and cryogenic. With its principle as following:



Main Overall Connection Dimensions of Cryogenic Ball Valves:

The main overall connection dimensions of cryogenic ball valve may be referred to side-mounted float ball valve and fixed ball valve, with the height of valve being the height of the long neck added to that basis, so dimensions list is omitted here.