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PIPELINE VALVE®

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PROVIDING COMPLETE CONTROL SOLUTIONS  
FOR INDUSTRIAL PIPELINES

# CRYOGENIC BALL VALVE

[WWW.FZVGROUP.COM](http://WWW.FZVGROUP.COM)



FANGZHENG VALVE GROUP CO., LTD

INDUSTRIAL PIPELINE CONTROL EXPERT

# FANGZHENG VALVE GROUP



We (FZV) commit ourselves to manufacturing excellent valves and achieving our customer satisfaction based on the principles of quality assurance and continual improvement.

We specialize in supplying a wide range of API 6D, API 609, API 600, API 594, API 6A, and API 16C products and wellhead equipment.

FZV was formally established in 1992, and so far, FZV has been approved by well-known international and domestic End-users and EPC companies.

FZV has set up three factories based in Shanghai and Wenzhou city with total area 76000 m<sup>2</sup> and maximum production capacity up to 32000 tons.

To enhance engineering designs and manufacture high-end products, FZV has in-house laboratory equipped with various facilities and test equipment to check and verify the product quality. The following tests are conducted in-house:

- Chemical analysis
- Mechanical test, Hardness, and impact test
- Non-destructive examination
- Salt spray test
- Fugitive emission test(ISO 15848-1 & 2)
- Deign validation testing (DVT) as per SHELL(MESC SPE 77/300)
- High temperature (Up to 550°C) and Cryogenic test (Up to -196°C)

FZV is certified by ISO 9001, ISO 14001, OHSAS 18001, API6D, API600, API609, API594, API607, API6A, API6A-PR2, API Spec.Q1, ABS, CCS, DNV, ATEX, and CE/PED, etc.

**FZV Main Products Range:**

**Product types:** Ball Valve, Gate Valve, Globe Valve, Check Valve, Butterfly Valve, Slab Gate Valve, Pipe Fitting, Cryogenic Valve, API6A Valve, Wellhead Equipment, Manifold & Christmas tree, etc.

**Implemented Standards:** ISO, API, BS, etc.

**Casting material:** WCB, LCB, WC6, WC9, C5, C12, CF3, CF3M, CF8, CF8M, C95500, 4A, 5A, Monel 400/500, Inconel 825/625, Titanium Alloy, etc.

**Forging material:** A105, LF2, F11, F12, F304, F321, F347, F316, 304L, 316L, C61900, F51, F53, F55, Inconel, Titanium Alloy, etc.

**Nominal diameter:** NPS 1/2"-68"(DN 15-DN 1,700)

**Nominal pressure:** API600 & API6D: CLASS 150~CLASS 2,500 (PN16~PN420)      API 6A: 2,000PSI~15,000PSI

**Temperature range:** -196°C-550°C

**Applications:** Onshore oil and gas exploitation and transportation, offshore oil and gas platform and FPSO / FLNG / FSRU, natural gas purification and liquefaction unit, LNG receiving station and vaporization unit, refining, chemical industry and chemistry, coal to gas (oil) and coal chemical industry, air separation, power station, aerospace, military industry and new energy (solar power generation, hydrogen energy, etc.) etc.

**The Business purpose of FZV:** Providing Complete Control Solutions For Industrial Pipelines.

**Our Advantages:**

1. Strict quality management system to ensure excellent product quality;
2. Excellent production management system to ensure the shortest delivery;
3. Competitive price;
4. Reponsive after-sales service.

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# OVERVIEW OF CRYOGENIC BALL VALVE

FZV has gained over ten years of experience in the production and research and development of cryogenic valves, by continuously adopting advanced foreign technology and referencing and improving it. Currently, our cryogenic ball valve technology is relatively mature, with multiple large-scale supply achievements. The product has undergone numerous rigorous tests under simulated operating conditions at the company and customer locations, and has passed a series of certifications such as MESG SPE 77/300 (Shell Industrial Valve Acceptance Testing), ensuring that the valve can be used for a long time at medium temperatures ranging from -196 to 150°C.

### MAIN PURPOSE

|                            |          |
|----------------------------|----------|
| Liquid ethane(Ethane)      | : -89°C  |
| Liquid ethane(Ethylene)    | : -104°C |
| Liquid methane(Methane)    | : -162°C |
| Liquified natural gas(LNG) | : -162°C |
| Liquid oxygen(Oxygen)      | : -183°C |
| Liquid nitrogen(Nitrogen)  | : -196°C |

### DESIGN STANDARDS

|                 |                                      |
|-----------------|--------------------------------------|
| MESG SPE 77/200 | Cryogenic valve specification        |
| GB/T 24925      | Cryogenic valve technical condition  |
| BS 6364         | Cryogenic valve                      |
| MESG SPE 77/312 | Products fugitive emission leak test |
| ISO 15848       | Products fugitive emission leak test |

## CLASSIFICATION OF CRYOGENIC VALVES

Cryogenic ball valves are classified according to their structural form

|            |                                                                 |
|------------|-----------------------------------------------------------------|
| Split type | Forged steel (cast steel) Cryogenic floating ball valve         |
|            | Forged steel (cast steel) Cryogenic trunnion mounted ball valve |
| Top entry  | Forged steel (cast steel) Cryogenic floating ball valve         |
|            | Forged steel (cast steel) Cryogenic trunnion mounted ball valve |



# SPLIT BODY CRYOGENIC FLOATING BALL VALVE

### REFERRED STANDARDS

Design and Manufacturing Standards: ISO 17292, API 6D, BS 6364,  
GB/T 24925, MESG SPE 77/200

Rated pressure and temperature: ASME B16.34

Face to face: ASME B16.10

Flange End dimension: ASME B16.5, HG/T 20592-20615

BW End: ASME B16.25

SW End: ASME B16.20

Inspection and Testing: BS 6364, GB/T 24925, MESG SPE 77/200

### PRODUCTION RANGE

Nominal diameter: 3/8"~10" DN10~DN250

Nominal pressure: Class 150~Class 600 PN20~PN100

Temperature range: -196°C~150°C

Connection methods: flange type, butt weld type,  
socket weld type, etc

Body Material: A182 F316, A351 CF8M

## STRUCTURAL CHARACTERISTICS OF SPLIT BODY CRYOGENIC FLOATING BALL VALVE

### Reliable sealing of stuffing box

The valve stem seal consists of three layers of seals: lip seal ring, low emission combination packing, and O-ring, ensuring sealing of stuffing box.

The packing is made by flexible graphite. In the event of valve fire or high temperature conditions where the lip seal ring fails, flexible graphite can continue to achieve valve stem sealing and respond to various unexpected situations.

The inner ring of the packing sleeve is equipped with RPTFE bearings, which can support the valve stem and provide self-lubricating function when the valve stem rotates.

A packing pad is used below the packing to prevent the packing from being squeezed into the gap between the valve stem and the upper cover during assembly and use, protecting the integrity of the packing and extending its lifespan.

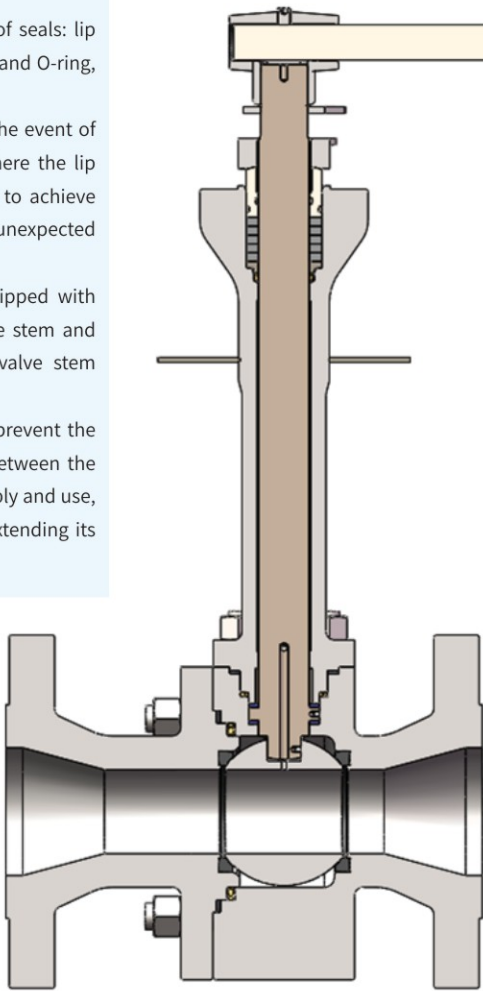
### Spring preloaded valve seat sealing structure

In comparison with conventional valve seat structures, the cryogenic structure includes more quantity of cylindrical springs at the bottom of the valve seat which improves the seat sealing while the sealing materials shrink due to ultra-low temperature.

### Fire safe structure design

The valve seat is designed with fire safe feature, which can continue to achieve valve seat sealing when the soft seat is burned out in case of fire or high temperature.

To provide fire safe design, The middle flange is composed of a metal and flexible graphite spiral wound gasket.



### Anti loosening structure

During the transition from ultra-low temperature to room temperature, fasteners will undergo corresponding deformation. In order to deal with this deformation, valves are designed with anti loosening gaskets at corresponding positions.

### Lockable design

Each valve is equipped with a hole to lock the lever to prevent accidental

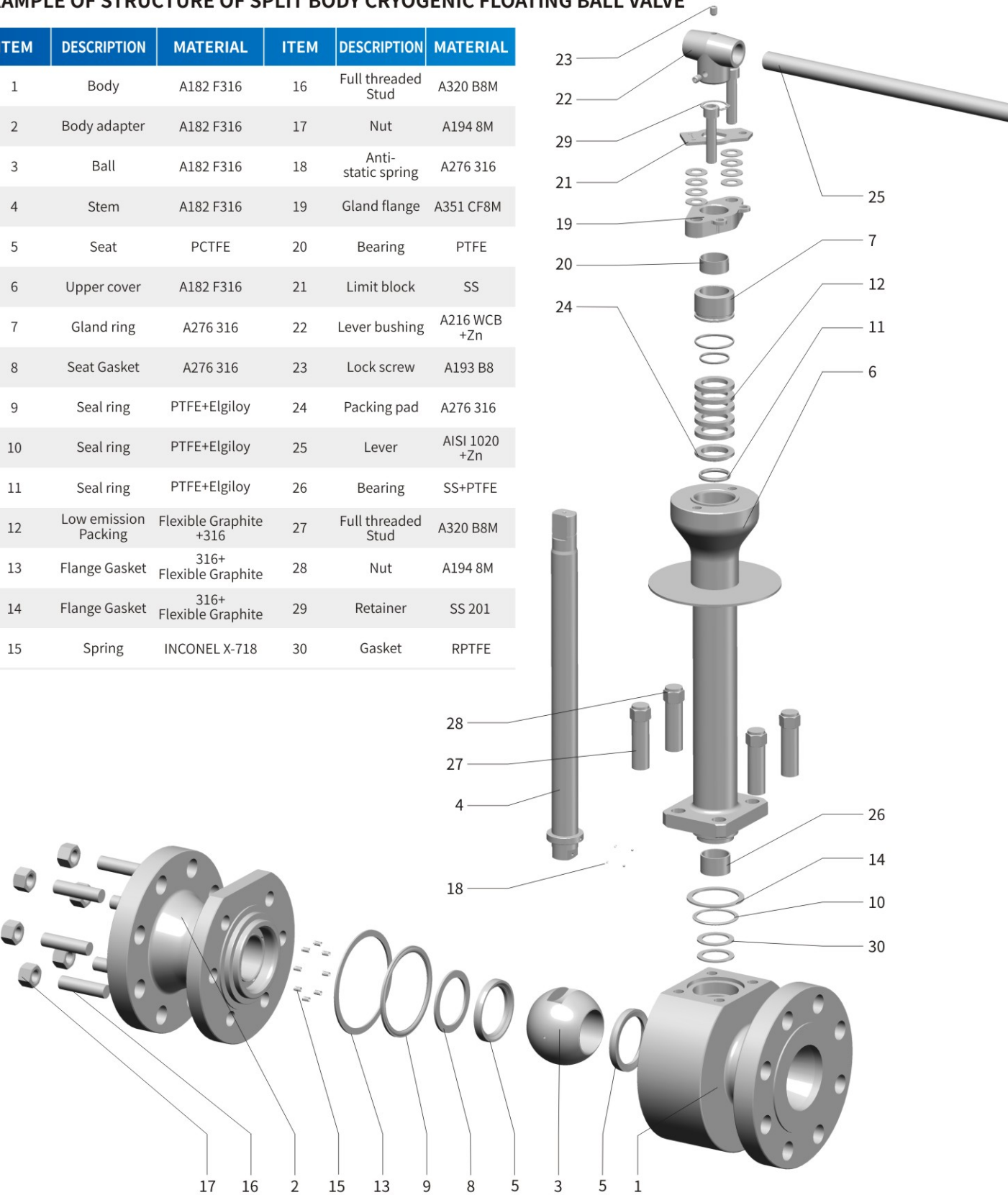
**Pressure relief mechanism**To provide a system to ensure that the cavity doesn't become over pressured, a pressure relief hole is designed on the ball and extended stem where are both connected to the middle cavity. When low-temperature media is trapped in the gap between the valve cavity, ball, stem, and upper cover, pressure can be released through these pressure relief holes.

### Extended upper cover design

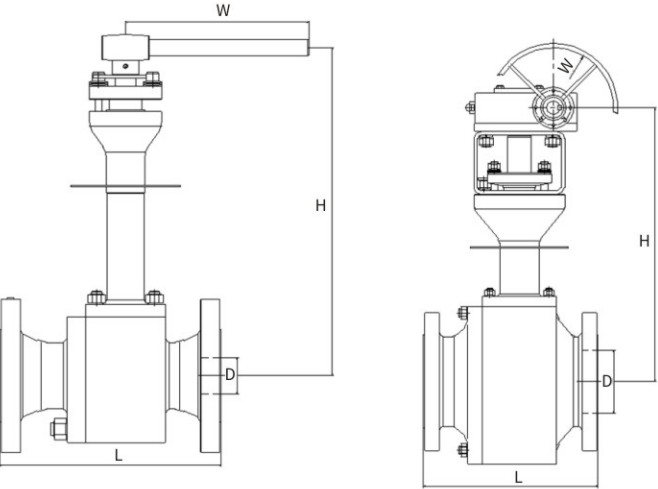
The use of an extended upper cover structure design separates the packing box and valve operating mechanism from the low-temperature medium, preventing the packing box temperature from being too low and causing humid air to freeze, reducing the amount of heat flowing into the system.

EXAMPLE OF STRUCTURE OF SPLIT BODY CRYOGENIC FLOATING BALL VALVE

| ITEM | DESCRIPTION          | MATERIAL               | ITEM | DESCRIPTION        | MATERIAL      |
|------|----------------------|------------------------|------|--------------------|---------------|
| 1    | Body                 | A182 F316              | 16   | Full threaded Stud | A320 B8M      |
| 2    | Body adapter         | A182 F316              | 17   | Nut                | A194 8M       |
| 3    | Ball                 | A182 F316              | 18   | Anti-static spring | A276 316      |
| 4    | Stem                 | A182 F316              | 19   | Gland flange       | A351 CF8M     |
| 5    | Seat                 | PCTFE                  | 20   | Bearing            | PTFE          |
| 6    | Upper cover          | A182 F316              | 21   | Limit block        | SS            |
| 7    | Gland ring           | A276 316               | 22   | Lever bushing      | A216 WCB +Zn  |
| 8    | Seat Gasket          | A276 316               | 23   | Lock screw         | A193 B8       |
| 9    | Seal ring            | PTFE+Elgiloy           | 24   | Packing pad        | A276 316      |
| 10   | Seal ring            | PTFE+Elgiloy           | 25   | Lever              | AISI 1020 +Zn |
| 11   | Seal ring            | PTFE+Elgiloy           | 26   | Bearing            | SS+PTFE       |
| 12   | Low emission Packing | Flexible Graphite +316 | 27   | Full threaded Stud | A320 B8M      |
| 13   | Flange Gasket        | 316+ Flexible Graphite | 28   | Nut                | A194 8M       |
| 14   | Flange Gasket        | 316+ Flexible Graphite | 29   | Retainer           | SS 201        |
| 15   | Spring               | INCONEL X-718          | 30   | Gasket             | RPTFE         |



MAIN DIMENSIONS AND WEIGHT OF SPLIT BODY CRYOGENIC FLOATING BALL VALVE



| CLASS 150/PN 20 |     |         |         |          |         |                 |                    |                    |
|-----------------|-----|---------|---------|----------|---------|-----------------|--------------------|--------------------|
| NPS             | DN  | D<br>mm | L<br>mm | H*<br>mm | W<br>mm | Cv<br>Usgal/min | WT(Casting)*<br>kg | WT(Forging)*<br>kg |
| 1/2             | 15  | 13      | 108     | 328      | 150     | 46              | 4                  | 4.1                |
| 3/4             | 20  | 19      | 117     | 332      | 150     | 97              | 4.8                | 6.7                |
| 1               | 25  | 25      | 127     | 391      | 320     | 168             | 6.7                | 8.6                |
| 1 1/2           | 40  | 38      | 165     | 416      | 300     | 389             | 11.6               | 16.8               |
| 2               | 50  | 49      | 178     | 464      | 350     | 647             | 18.6               | 28.5               |
| 3               | 80  | 74      | 203     | 535      | 400     | 2086            | 35.3               | 43.5               |
| 4               | 100 | 100     | 229     | 646      | 350     | 2694            | 60                 | 78                 |
| 6               | 150 | 150     | 394     | 771      | 465     | 6062            | 165                | 195                |
| 8               | 200 | 201     | 457     | 806      | 600     | 10885           | 270                | 357                |
| 10              | 250 | 252     | 533     | 900      | 600     | 17109           | 495                | 630                |

4 "and above are worm gear operations, and the values marked with \* are reference values

| CLASS 300/PN 50 |     |         |         |          |         |                 |                    |                    |
|-----------------|-----|---------|---------|----------|---------|-----------------|--------------------|--------------------|
| NPS             | DN  | D<br>mm | L<br>mm | H*<br>mm | W<br>mm | Cv<br>Usgal/min | WT(Casting)*<br>kg | WT(Forging)*<br>kg |
| 1/2             | 15  | 13      | 140     | 372      | 260     | 46              | 5.25               | 6.4                |
| 3/4             | 20  | 19      | 152     | 392      | 300     | 97              | 6.75               | 10.5               |
| 1               | 25  | 25      | 165     | 392      | 320     | 168             | 10.95              | 15                 |
| 1 1/2           | 40  | 38      | 190     | 437      | 430     | 389             | 18                 | 24                 |
| 2               | 50  | 50      | 216     | 474      | 450     | 647             | 24.6               | 36                 |
| 3               | 80  | 74      | 283     | 547      | 550     | 2086            | 47.25              | 63                 |
| 4               | 100 | 100     | 305     | 646      | 350     | 2694            | 67.5               | 85.5               |
| 6               | 150 | 150     | 403     | 801      | 600     | 6062            | 172.5              | 205.5              |
| 8               | 200 | 202     | 502     | 827      | 600     | 10885           | 403.5              | 480                |
| 10              | 250 | 252     | 568     | 930      | 600     | 17109           | 570                | 735                |

4 "and above are worm gear operations, and the values marked with \* are reference values

SPLIT BODY CRYOGENIC TRUNNION MOUNTED BALL VALVE

REFERRED STANDARDS

Design and Manufacturing Standards: SO 17292, API 6D, BS 6364,  
GB/T 24925, MESG SPE 77/200

Rated pressure and temperature: ASME B16.34

Face to face: ASME B16.10

Flange End dimension: ASME B16.5、HG/T 20592-20615

BW End: ASME B16.25

Inspection and Testing: BS 6364、GB/T 24925、MESG SPE 77/200

PRODUCTION RANGE

Nominal diametere: 2"~36" DN50~DN900

Nominal pressuree: Class 150~Class 1,500

PN20~PN250

Temperature rangee: -196°C~150°C

Connection methodse: flange type, butt weld type, etc

Body Materiale: A182 F316, A351 CF8M

STRUCTURAL CHARACTERISTICS OF SPLIT BODY CRYOGENIC TRUNNION MOUNTED BALL VALVE

Valve seat sealing structure

The valve seat adopts a split structure design, replacing the traditional valve seat ring rolling method. At the same time, it is equipped with Lip Seal lip seals on the back and special processing technology to ensure more stable and reliable sealing at low temperatures, while also having pressure self relief function.

Extended upper-Cover and drip plate structure

The extended valve cover design can effectively ensure that the temperature of the packing box and above is above 0 °C, preventing ice formation in the packing area from affecting the sealing effect and normal operation of the valve stem; Drip plate can effectively prevent condensed water from entering the insulation layer, affecting valve corrosion and maintenance.

Fire safe design

The valve seat is designed with fire safe feature, which can continue to achieve valve seat sealing when the soft seat is burned out in case of fire or high temperature.

To provide fire safe design, The top flange is composed of a metal and flexible graphite spiral wounded gasket.

Reliable sealing of stuffing box

The valve stem seal consists of three layers of seals: lip seal ring, a set of low-emission packings, and O-ring, ensuring sealing of stuffing box.

The main component of the packing is flexible graphite. In the event of valve fire or high temperature conditions where the lip seal ring fails, flexible graphite can continue to achieve valve stem sealing and respond to various unexpected situations.

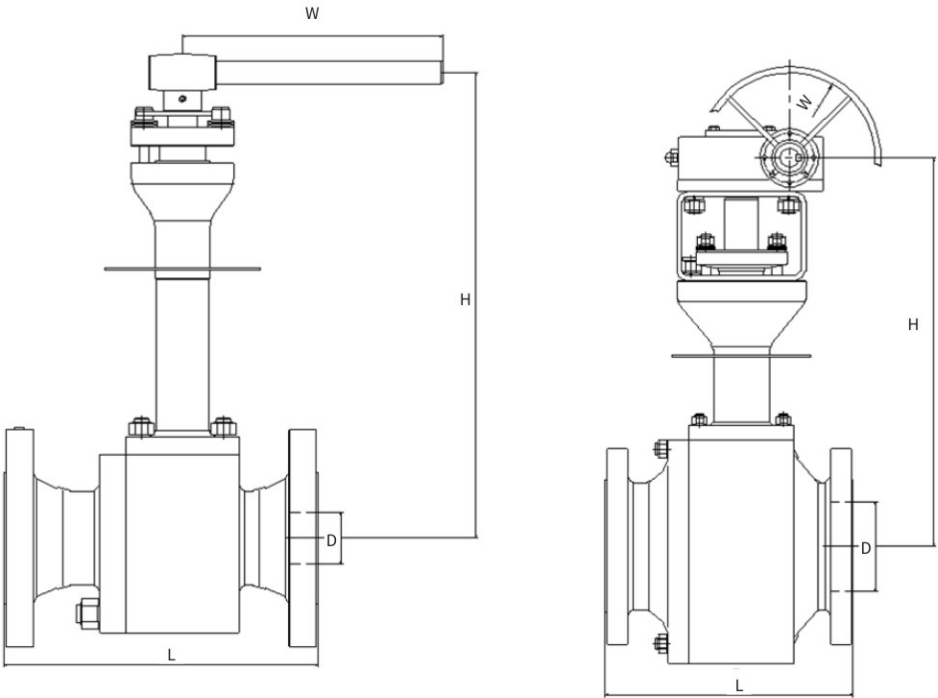
A packing pad is used below the packing to prevent the packing from being squeezed into the gap between the valve stem and the upper cover during assembly and use, protecting the integrity of the packing and extending its lifespan.

Anti external leakage design

All external leaks point are designed with a double-sealing structure, consisting of a lip-seal ring and a metal spiral wounded gasket, to ensure that no external leaks occur under any circumstances, keep it safe and reliable.

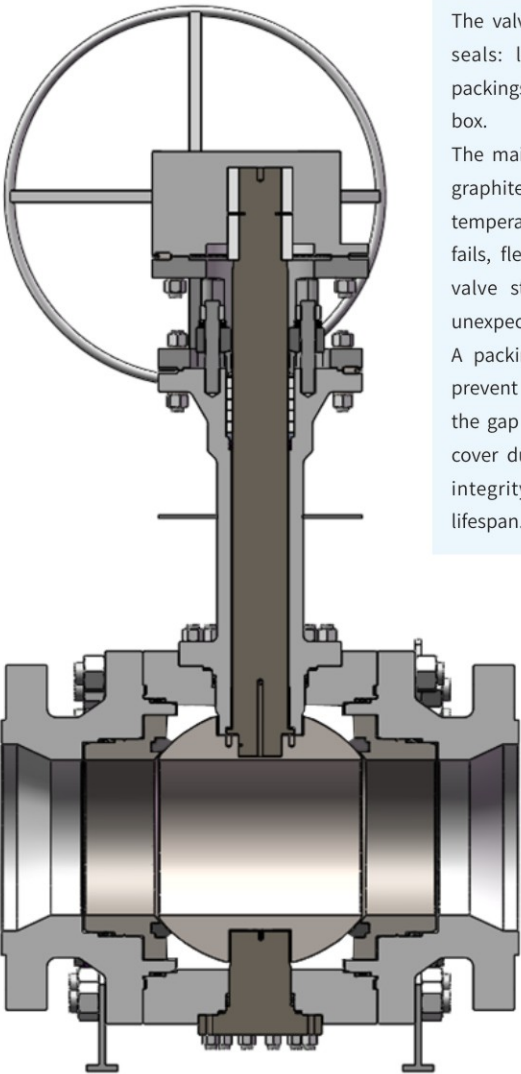
Split body structure design

Adopting a split structure, the length of individual parts is relatively short, which is conducive to processing to ensure process requirements and reduce costs.



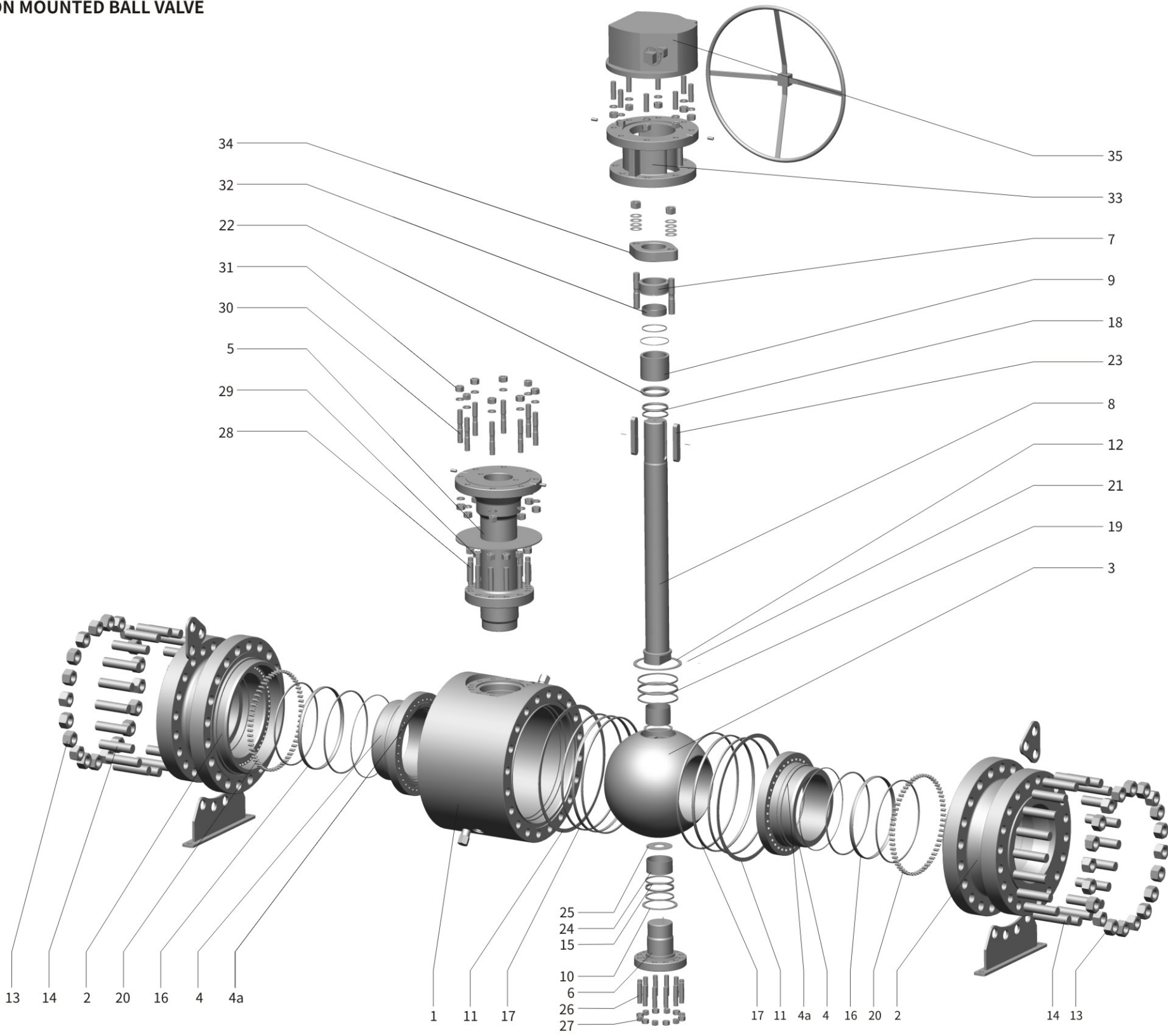
| CLASS 600/PN 100 |     |         |         |          |         |                 |                    |                    |
|------------------|-----|---------|---------|----------|---------|-----------------|--------------------|--------------------|
| NPS              | DN  | D<br>mm | L<br>mm | H*<br>mm | W<br>mm | Cv<br>Usgal/min | WT(Casting)*<br>kg | WT(Forging)*<br>kg |
| 1/2              | 15  | 13      | 165     | 333      | 150     | 46              | 6.8                | 7.2                |
| 3/4              | 20  | 19      | 190     | 300      | 350     | 97              | 8.7                | 14.3               |
| 1                | 25  | 25      | 216     | 391      | 350     | 168             | 12.8               | 25.5               |
| 1 1/2            | 40  | 38      | 241     | 400      | 380     | 389             | 22.5               | 30                 |
| 2                | 50  | 50      | 292     | 476      | 580     | 647             | 34.5               | 46.5               |
| 3                | 80  | 74      | 356     | 580      | 710     | 2086            | 87                 | 95.3               |
| 4                | 100 | 100     | 432     | 662      | 460     | 2694            | 114                | 132                |
| 6                | 150 | 151     | 559     | 858      | 600     | 6062            | 208.5              | 243                |
| 8                | 200 | 202     | 660     | 934      | 600     | 10885           | 505.5              | 555                |
| 10               | 250 | 252     | 787     | 1027     | 600     | 17109           | 645                | 709.5              |

4 "and above are worm gear operations, and the values marked with \* are reference values

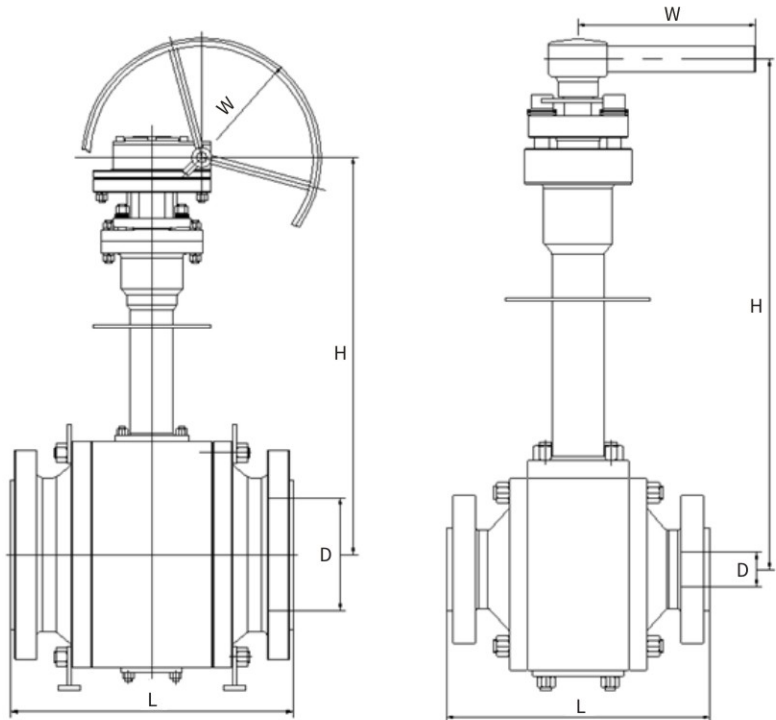


EXAMPLE OF STRUCTURE OF SPLIT BODY CRYOGENIC TRUNNION MOUNTED BALL VALVE

| ITEM | DESCRIPTION        | MATERIAL              |
|------|--------------------|-----------------------|
| 1    | Body               | A182 F316             |
| 2    | Body adapter       | A182 F316             |
| 3    | Ball               | A182 F316             |
| 4    | Seat               | A182 F316             |
| 4a   | Seat insert        | PCTFE                 |
| 5    | Upper cover        | A182 F316             |
| 6    | Low cover          | A182 F316             |
| 7    | Gland ring         | A276 316              |
| 8    | Stem               | A182 F316             |
| 9    | Packing            | Flexible Graphite+316 |
| 10   | Flange Gasket      | 316+Flexible Graphite |
| 11   | Flange Gasket      | 316+Flexible Graphite |
| 12   | Flange Gasket      | 316+Flexible Graphite |
| 13   | Nut                | A194 8M               |
| 14   | Stud               | A320 B8M CLASS 2      |
| 15   | Seal ring          | PTFE+Elgiloy          |
| 16   | Seal ring          | PTFE+Elgiloy          |
| 17   | Seal ring          | PTFE+Elgiloy          |
| 18   | Seal ring          | PTFE+Elgiloy          |
| 19   | Seal ring          | PTFE+Elgiloy          |
| 20   | Spring             | INCONEL 718           |
| 21   | Anti-static spring | A276 304              |
| 22   | Packing pad        | A276 316              |
| 23   | Key                | AISI 1045             |
| 24   | Bearing            | 316+PTFE              |
| 25   | Gasket             | 316+PTFE              |
| 26   | Full threaded Stud | A320 B8M CLASS 2      |
| 27   | Nut                | A194 8M               |
| 28   | Full threaded Stud | A320 B8M CLASS 2      |
| 29   | Nut                | A194 8M               |
| 30   | Full threaded Stud | A320 B8M CLASS 2      |
| 31   | Nut                | A194 8M               |
| 32   | Bearing            | RPTFE                 |
| 33   | Yoke               | A216 WCB+ENP          |
| 34   | Gland flange       | A182 F316             |
| 35   | Worm gear          | Ductile iron          |



MAIN DIMENSIONS AND WEIGHT OF SPLIT BODY  
CRYOGENIC TRUNNION MOUNTED BALL VALVE



| CLASS 150/PN 20 |     |     |      |      |     |           |              |
|-----------------|-----|-----|------|------|-----|-----------|--------------|
| NPS             | DN  | D   | L    | H*   | W   | Cv        | WT(Forging)* |
|                 |     | mm  | mm   | mm   | mm  | Usgal/min | kg           |
| 2               | 50  | 49  | 178  | 456  | 350 | 647       | 25           |
| 3               | 80  | 74  | 203  | 583  | 400 | 2086      | 56           |
| 4               | 100 | 100 | 229  | 610  | 350 | 2694      | 73           |
| 6               | 150 | 150 | 394  | 845  | 600 | 6062      | 231          |
| 8               | 200 | 201 | 457  | 890  | 600 | 10885     | 455          |
| 10              | 250 | 252 | 533  | 984  | 600 | 17109     | 693          |
| 12              | 300 | 303 | 610  | 1038 | 600 | 24734     | 969          |
| 14              | 350 | 334 | 686  | 1123 | 600 | 30055     | 1437         |
| 16              | 400 | 385 | 762  | 1168 | 600 | 39934     | 1872         |
| 20              | 500 | 487 | 914  | 1289 | 600 | 63865     | 2940         |
| 24              | 600 | 589 | 1067 | 1369 | 600 | 96465     | 4429         |
| 26              | 650 | 633 | 1143 | 1459 | 600 | 107706    | 5433         |
| 28              | 700 | 684 | 1245 | 1499 | 600 | 125760    | 6719         |
| 30              | 750 | 735 | 1295 | 1539 | 600 | 145213    | 7874         |
| 32              | 800 | 779 | 1372 | 1592 | 600 | 163119    | 9681         |
| 36              | 900 | 874 | 1524 | 1718 | 600 | 205330    | 13057        |

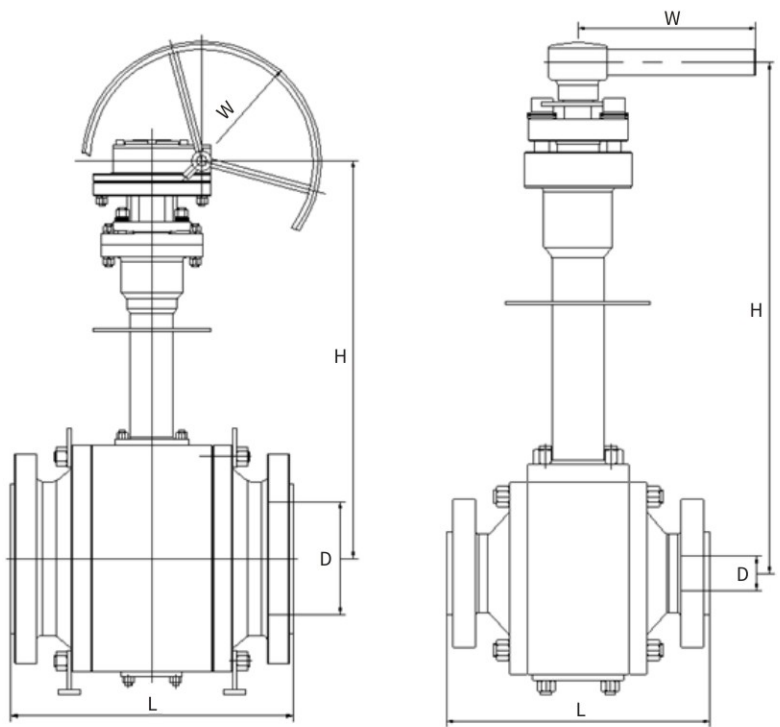
4"and above are worm gear operations, and the values marked with \* are reference values

| CLASS 300/PN 50 |     |     |      |      |     |           |              |
|-----------------|-----|-----|------|------|-----|-----------|--------------|
| NPS             | DN  | D   | L    | H*   | W   | Cv        | WT(Forging)* |
|                 |     | mm  | mm   | mm   | mm  | Usgal/min | kg           |
| 2               | 50  | 49  | 216  | 456  | 430 | 647       | 61           |
| 3               | 80  | 74  | 283  | 583  | 500 | 2086      | 128          |
| 4               | 100 | 100 | 305  | 610  | 350 | 2694      | 178          |
| 6               | 150 | 150 | 403  | 845  | 600 | 6062      | 375          |
| 8               | 200 | 201 | 502  | 890  | 600 | 10885     | 620          |
| 10              | 250 | 252 | 533  | 984  | 600 | 17109     | 808          |
| 12              | 300 | 303 | 648  | 1038 | 600 | 24734     | 1293         |
| 14              | 350 | 334 | 762  | 1123 | 600 | 30055     | 1943         |
| 16              | 400 | 385 | 838  | 1168 | 600 | 39934     | 2491         |
| 20              | 500 | 487 | 991  | 1289 | 600 | 63865     | 3918         |
| 24              | 600 | 589 | 1143 | 1369 | 600 | 96465     | 5869         |
| 26              | 650 | 633 | 1245 | 1459 | 600 | 107706    | 5625         |
| 28              | 700 | 684 | 1346 | 1499 | 600 | 125760    | 6720         |
| 30              | 750 | 735 | 1397 | 1539 | 600 | 145213    | 7527         |
| 32              | 800 | 779 | 1524 | 1592 | 600 | 163119    | 9590         |
| 36              | 900 | 874 | 1727 | 1718 | 600 | 205330    | 12945        |

4"and above are worm gear operations, and the values marked with \* are reference values

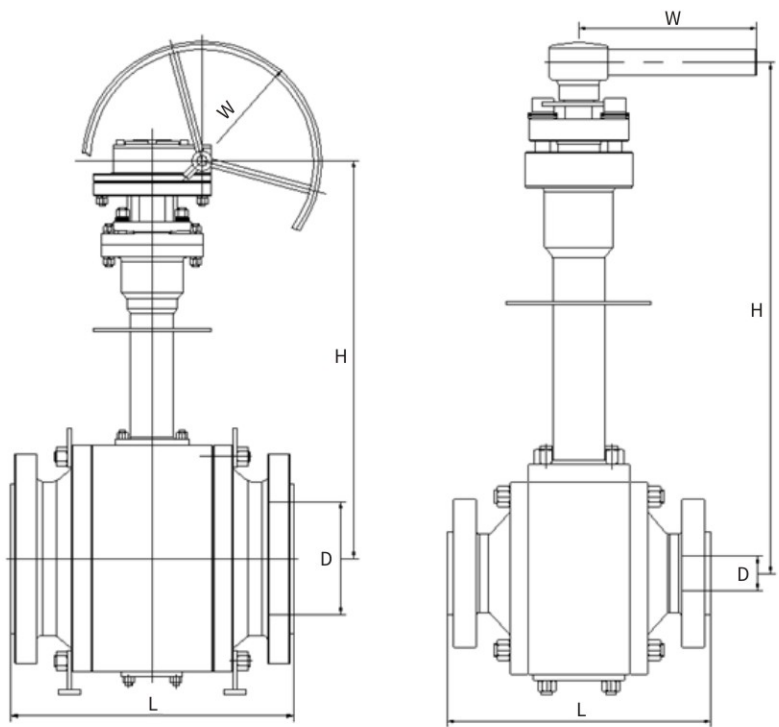
| CLASS 600/PN 100 |     |     |      |      |     |           |              |
|------------------|-----|-----|------|------|-----|-----------|--------------|
| NPS              | DN  | D   | L    | H*   | W   | Cv        | WT(Forging)* |
|                  |     | mm  | mm   | mm   | mm  | Usgal/min | kg           |
| 2                | 50  | 49  | 292  | 466  | 550 | 647       | 95           |
| 3                | 80  | 74  | 356  | 597  | 460 | 2086      | 181          |
| 4                | 100 | 100 | 432  | 641  | 460 | 2694      | 325          |
| 6                | 150 | 150 | 559  | 899  | 600 | 6062      | 717          |
| 8                | 200 | 201 | 660  | 943  | 600 | 10885     | 1076         |
| 10               | 250 | 252 | 787  | 1056 | 600 | 17109     | 1783         |
| 12               | 300 | 303 | 838  | 1091 | 600 | 24734     | 2124         |
| 14               | 350 | 334 | 889  | 1172 | 600 | 30055     | 2571         |
| 16               | 400 | 385 | 991  | 1230 | 600 | 39934     | 3524         |
| 20               | 500 | 487 | 1194 | 1369 | 600 | 63865     | 5629         |
| 24               | 600 | 589 | 1397 | 1458 | 600 | 96465     | 8282         |
| 26               | 650 | 633 | 1448 | 1561 | 600 | 107706    | 9854         |
| 28               | 700 | 684 | 1549 | 1601 | 600 | 125760    | 11474        |
| 30               | 750 | 735 | 1651 | 1641 | 600 | 145213    | 13256        |
| 32               | 800 | 779 | 1778 | 1686 | 600 | 163119    | 15836        |
| 36               | 900 | 874 | 2083 | 1820 | 600 | 205330    | 22511        |

3"and above are worm gear operations, and the values marked with \* are reference values



| CLASS 900/PN 150 |     |     |      |      |     |           |              |
|------------------|-----|-----|------|------|-----|-----------|--------------|
| NPS              | DN  | D   | L    | H*   | W   | Cv        | WT(Forging)* |
|                  |     | mm  | mm   | mm   | mm  | Usgal/min | kg           |
| 2                | 50  | 49  | 368  | 501  | 360 | 645       | 188          |
| 3                | 80  | 74  | 381  | 619  | 460 | 1472      | 239          |
| 4                | 100 | 100 | 457  | 654  | 600 | 2688      | 388          |
| 6                | 150 | 150 | 610  | 917  | 600 | 6048      | 898          |
| 8                | 200 | 201 | 737  | 979  | 600 | 10860     | 1503         |
| 10               | 250 | 252 | 838  | 1082 | 600 | 17070     | 2189         |
| 12               | 300 | 303 | 965  | 1127 | 600 | 24678     | 3017         |
| 14               | 350 | 322 | 1029 | 1199 | 600 | 27870     | 3579         |
| 16               | 400 | 373 | 1130 | 1244 | 600 | 37398     | 4534         |
| 20               | 500 | 471 | 1321 | 1400 | 600 | 59631     | 7321         |
| 24               | 600 | 570 | 1549 | 1529 | 600 | 87333     | 11988        |
| 26               | 650 | 617 | 1651 | 1610 | 600 | 102329    | 13794        |
| 30               | 750 | 712 | 1880 | 1712 | 600 | 136267    | 19537        |
| 36               | 900 | 855 | 2286 | 1922 | 600 | 196500    | 32722        |

2"and above are worm gear operations, and the values marked with \* are reference values



| CLASS 1500/PN 250 |     |     |      |      |     |           |              |
|-------------------|-----|-----|------|------|-----|-----------|--------------|
| NPS               | DN  | D   | L    | H*   | W   | Cv        | WT(Forging)* |
|                   |     | mm  | mm   | mm   | mm  | Usgal/min | kg           |
| 2                 | 50  | 49  | 368  | 501  | 360 | 645       | 188          |
| 3                 | 80  | 74  | 470  | 619  | 460 | 1472      | 327          |
| 4                 | 100 | 100 | 546  | 654  | 600 | 2688      | 503          |
| 6                 | 150 | 144 | 705  | 917  | 600 | 5574      | 1123         |
| 8                 | 200 | 192 | 832  | 979  | 600 | 9909      | 1813         |
| 10                | 250 | 239 | 991  | 1082 | 600 | 15354     | 2835         |
| 12                | 300 | 287 | 1130 | 1127 | 600 | 22141     | 3864         |
| 14                | 350 | 315 | 1257 | 1199 | 600 | 26672     | 4839         |
| 16                | 400 | 360 | 1384 | 1244 | 600 | 34836     | 6185         |
| 20                | 500 | 454 | 1664 | 1400 | 600 | 55404     | 10390        |
| 26                | 650 | 594 | 1943 | 1560 | 600 | 94842     | 17484        |

2"and above are worm gear operations, and the values marked with \* are reference values

TOP ENTRY CRYOGENIC FLOATING BALL VALVE

REFERRED STANDARDS

Design and Manufacturing Standards: ISO 17292, API 6D, BS 6364,  
GB/T 24925, MESG SPE 77/200

Rated pressure and temperature: ASME B16.34

Face to face: ASME B16.10

Flange End dimension: ASME B16.5, HG/T 20592-20615

BW End: ASME B16.25

SW End: ASME B16.20

Inspection and Testing: BS 6364, GB/T 24925, MESG SPE 77/200

PRODUCTION RANGE

Nominal diameter: 3/8"~10" DN10~DN250

Nominal pressure: Class 150~Class 600

PN20~PN100

Temperature range: -196°C~150°C

Connection methods: flange type, butt weld type,  
socket weld type, etc

Body Material: A182 F316、A351 CF8M

STRUCTURAL CHARACTERISTICS OF TOP ENTRY CRYOGENIC FLOATING BALL VALVE

Integrated valve body design

The valve body adopts an integrated forging or casting structure, reducing leakage points; The valve seat adopts a compressed spring form, which can realize in-line maintenance by having access to the ball and valve seat and other internal components from the top flange.

Design of integral forged valve cover

Adopting an integral forged valve cover structure avoids the occurrence of welding stress and other defects in segmented welded structures, while reducing the number of leakage points caused by welding defects and ensuring the sealing reliability of the entire machine.

Multiple valve seat structures to choose from

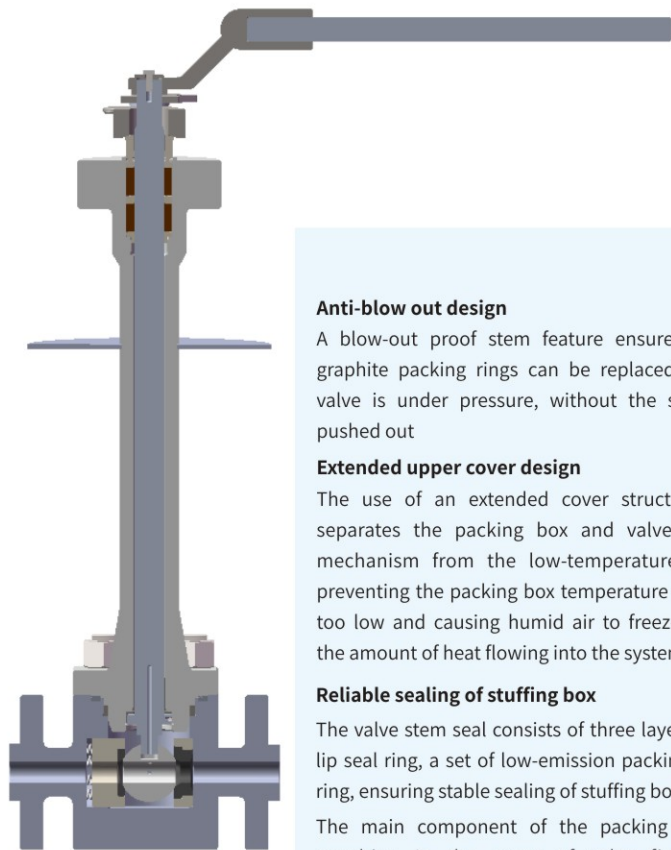
According to the different specifications and structures of the size and class , the valve seat can adopt a straight face type or a wedge-shaped structure. The straight face type uses spring pre-tightening to achieve sealing, while the wedge-shaped type relies on its own structure to achieve rapid pre-tightening function, ensuring reliable sealing.

Fire safe and anti-static design

The valve seat is designed with fire safe feature, which can continue to achieve valve seat sealing when the soft seat is burned out in case of fire or high temperature.

To provide fire safe design, The top flange is composed of a metal and flexible graphite spiral wounded gasket.

By adding springs and steel balls between the valve body, valve stem, and ball, static electricity is never generated, ensuring safety and reliability.



Pressure relief mechanism

There are pressure relief holes on the ball and valve stem, which can be used to release pressure when low-temperature media is trapped in the valve cavity, the cavity does not become over pressured. preventing accidents.

Anti-blow out design

A blow-out proof stem feature ensures that the graphite packing rings can be replaced while the valve is under pressure, without the stem being pushed out

Extended upper cover design

The use of an extended cover structure design separates the packing box and valve operating mechanism from the low-temperature medium, preventing the packing box temperature from being too low and causing humid air to freeze, reducing the amount of heat flowing into the system.

Reliable sealing of stuffing box

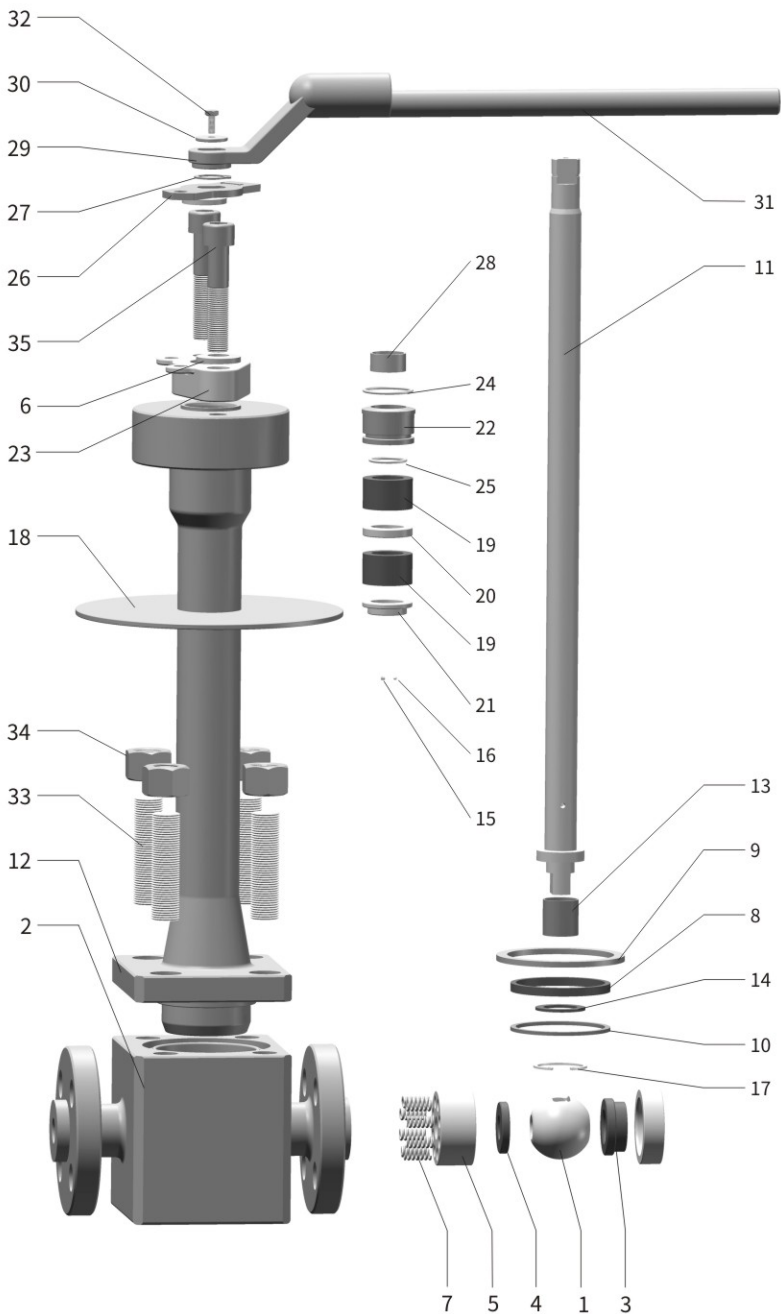
The valve stem seal consists of three layers of seals: lip seal ring, a set of low-emission packings, and O-ring, ensuring stable sealing of stuffing box.

The main component of the packing is flexible graphite. In the event of valve fire or high temperature conditions where the lip seal ring fails, flexible graphite can continue to achieve valve stem sealing and respond to various unexpected situations.

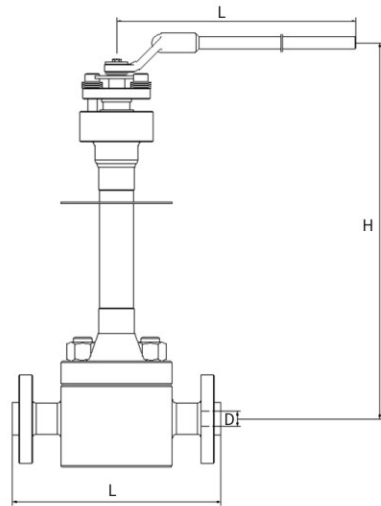
A packing pad is used below the packing to prevent the packing from being squeezed into the gap between the valve stem and the upper cover during assembly and use, protecting the integrity of the packing and extending its lifespan.

STRUCTURAL EXAMPLE OF TOP ENTRY CRYOGENIC TEMPERATURE FLOATING BALL VALVE

| ITEM | DESCRIPTION            | MATERIAL              |
|------|------------------------|-----------------------|
| 1    | Ball                   | A182 F316             |
| 2    | Body                   | A182 F316             |
| 3    | Seat I                 | PCTFE                 |
| 4    | Seat II                | PCTFE                 |
| 5    | Seat support ring I    | A182 F316             |
| 6    | Disc spring            | INCONEL X-718         |
| 7    | Spring                 | INCONEL X-718         |
| 8    | Seal ring              | Composite components  |
| 9    | Flange gasket          | 316+Flexible graphite |
| 10   | Gasket                 | PCTFE                 |
| 11   | Stem                   | A182 F316             |
| 12   | Bonnet                 | A182 F316             |
| 13   | Bearing                | SS+PTFE               |
| 14   | Gasket                 | PCTFE                 |
| 15   | Anti-static spring     | A276 316              |
| 16   | Anti-static steel ball | A276 316              |
| 17   | Retainer               | SS201                 |
| 18   | Isolation board        | A240 304              |
| 19   | Packing                | Flexible graphite     |
| 20   | Spacer                 | A276 316              |
| 21   | Packing pad            | A276 316              |
| 22   | Gland ring             | A276 316              |
| 23   | Gland flange           | A351 CF8M             |
| 24   | O-ring                 | HNBR-LT(AED)          |
| 25   | O-ring                 | HNBR-LT(AED)          |
| 26   | Limit block            | A240 316              |
| 27   | Retainer               | SS 201                |
| 28   | Bearing                | SS+PTFE               |
| 29   | Lever joint            | A216 WCB              |
| 30   | Lever gasket           | SS                    |
| 31   | Lever                  | AISI 1020             |
| 32   | Hex bolt               | A320 B8M CLASS 2      |
| 33   | Stud                   | A320 B8M CLASS 2      |
| 34   | Nut                    | A194 8M               |
| 35   | Hex screw              | A320 B8M CLASS 2      |



MAIN DIMENSIONS AND WEIGHT OF TOP ENTRY  
CRYOGENIC FLOATINGBALL VALVE



| CLASS 150/PN 20 |     |     |     |     |     |           |                           |      |
|-----------------|-----|-----|-----|-----|-----|-----------|---------------------------|------|
| NPS             | DN  | D   | L   | H*  | W   | Cv        | WT(Casting)* WT(Forging)* |      |
|                 |     | mm  | mm  | mm  | mm  | Usgal/min | kg                        | kg   |
| 1/2             | 15  | 13  | 165 | 312 | 150 | 46        | 6.2                       | 7.3  |
| 3/4             | 20  | 19  | 190 | 315 | 150 | 97        | 8                         | 14.5 |
| 1               | 25  | 25  | 216 | 382 | 320 | 168       | 11.9                      | 25.8 |
| 1 1/2           | 40  | 38  | 241 | 401 | 320 | 389       | 21                        | 31   |
| 2               | 50  | 49  | 292 | 447 | 350 | 647       | 25                        | 47   |
| 3               | 80  | 74  | 356 | 512 | 400 | 2086      | 80                        | 95   |
| 4               | 100 | 100 | 432 | 618 | 350 | 2694      | 105                       | 131  |
| 6               | 150 | 150 | 559 | 740 | 465 | 6062      | 192                       | 242  |
| 8               | 200 | 201 | 660 | 775 | 600 | 10885     | 465                       | 550  |
| 10              | 250 | 252 | 787 | 868 | 600 | 17109     | 593                       | 701  |

| CLASS 300/PN 50 |     |     |     |     |     |           |                           |      |
|-----------------|-----|-----|-----|-----|-----|-----------|---------------------------|------|
| NPS             | DN  | D   | L   | H*  | W   | Cv        | WT(Casting)* WT(Forging)* |      |
|                 |     | mm  | mm  | mm  | mm  | Usgal/min | kg                        | kg   |
| 1/2             | 15  | 13  | 165 | 351 | 260 | 260       | 7                         | 8.1  |
| 3/4             | 20  | 19  | 190 | 370 | 300 | 300       | 9                         | 16.2 |
| 1               | 25  | 25  | 216 | 372 | 320 | 320       | 13.4                      | 28.9 |
| 1 1/2           | 40  | 38  | 241 | 413 | 430 | 430       | 24                        | 34   |
| 2               | 50  | 49  | 292 | 450 | 500 | 500       | 32                        | 53   |
| 3               | 80  | 74  | 356 | 522 | 550 | 550       | 90                        | 108  |
| 4               | 100 | 100 | 432 | 618 | 350 | 350       | 118                       | 148  |
| 6               | 150 | 150 | 559 | 773 | 600 | 600       | 216                       | 272  |

| CLASS 600/PN 100 |     |     |     |     |     |           |                           |      |
|------------------|-----|-----|-----|-----|-----|-----------|---------------------------|------|
| NPS              | DN  | D   | L   | H*  | W   | Cv        | WT(Casting)* WT(Forging)* |      |
|                  |     | mm  | mm  | mm  | mm  | Usgal/min | kg                        | kg   |
| 1/2              | 15  | 13  | 165 | 326 | 150 | 46        | 7.8                       | 9    |
| 3/4              | 20  | 19  | 190 | 339 | 350 | 97        | 10                        | 17.9 |
| 1                | 25  | 25  | 216 | 376 | 350 | 168       | 14.8                      | 32   |
| 1 1/2            | 40  | 38  | 241 | 384 | 450 | 389       | 26                        | 37.8 |
| 2                | 50  | 49  | 292 | 458 | 580 | 647       | 31                        | 58   |
| 3                | 80  | 74  | 356 | 556 | 710 | 2086      | 100                       | 120  |
| 4                | 100 | 100 | 432 | 634 | 460 | 2694      | 131                       | 165  |

4 "and above are worm gear operations, and the values marked with \* are reference values

TOP ENTRY CRYOGENIC TRUNNION MOUNTED BALL VALVE

REFERRED STANDARDS

Design and Manufacturing Standards: ISO 17292、API 6D、BS 6364、  
GB/T 24925、MESC SPE 77/200  
Rated pressure and temperature: ASME B16.34  
Flange End dimension: ASME B16.10  
Flange End dimension: ASME B16.5、HG/T 20592-20615  
BW End: ASME B16.25  
Inspection and Testing: BS 6364、GB/T 24925、MESC SPE 77/200

PRODUCTION RANGE

Nominal diameter: 2"~36" DN50~DN900  
Nominal pressure: Class 150~Class 1,500  
PN20~PN250  
Temperature range: -196°C~150°C  
Connection methods: flange type, butt weld type,etc  
Body Material: A182 F316、A351 CF8M

STRUCTURAL CHARACTERISTICS OF TOP ENTRY CRYOGENIC TRUNNION MOUNTED BALL VALVE

Unique valve seat combination sealing structure design

The valve seat, in conjunction with the valve seat adjustment nut, adopts a telescopic adjustment structure. The valve seat insert ring is compressed instead of traditional rolling, resulting in more stable sealing performance at low temperatures. At the same time, it is matched with the Lip Seal lip seal ring on the back of the valve seat to achieve back sealing.

Integrated valve body structure

Adopting an integral valve body structure, the end can be connected with flanges or welded ends as needed. The integral valve body has fewer leakage points and better rigidity compared to the side mounted valve body, avoiding external leakage and resisting the influence of pipeline pressure on the valve. At the same time, by adjusting the valve seat nut, the ball, valve seat and other parts can be removed, truly achieving in-line maintenance.

Bearing guidance function

The upper and lower ends of the valve stem are respectively designed with guide bearings to ensure that the extended valve stem is always in a centered state during rotation, ensuring the sealing of the valve stem and minimizing the valve torque.

Long neck valve cover and drip plate structure

The extended valve cover design can effectively ensure that the temperature of the packing box and above is above 0 °C, preventing ice formation in the packing area from affecting the sealing effect and normal operation of the valve stem; Dripping plate can effectively prevent condensed water from entering the insulation layer, affecting valve corrosion and maintenance.

Fire safe and anti-static design

The valve seat is designed with fire safe feature, which can continue to achieve valve seat sealing when the soft seat is burned out in case of fire or high temperature.  
To provide fire safe design, The top flange is composed of a metal and flexible graphite spiral wounded gasket.  
By adding springs and steel balls between the valve body, valve stem, and ball, static electricity is never generated.

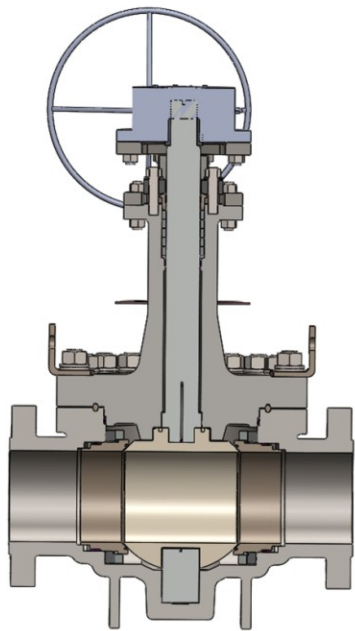
Reliable sealing of stuffing box

The valve stem seal consists of three layers of seals: lip seal ring, set of low-emission packings, and O-ring, ensuring sealing of stuffing box.  
The main component of the packing is flexible graphite. In the event of valve fire or high temperature conditions where the lip seal ring fails, flexible flexible graphite can continue to achieve valve stem sealing and respond to various unexpected situations.

A packing pad is used below the packing to prevent the packing from being squeezed into the gap between the valve stem and the upper cover during assembly and use, protecting the integrity of the packing and extending its lifespan.

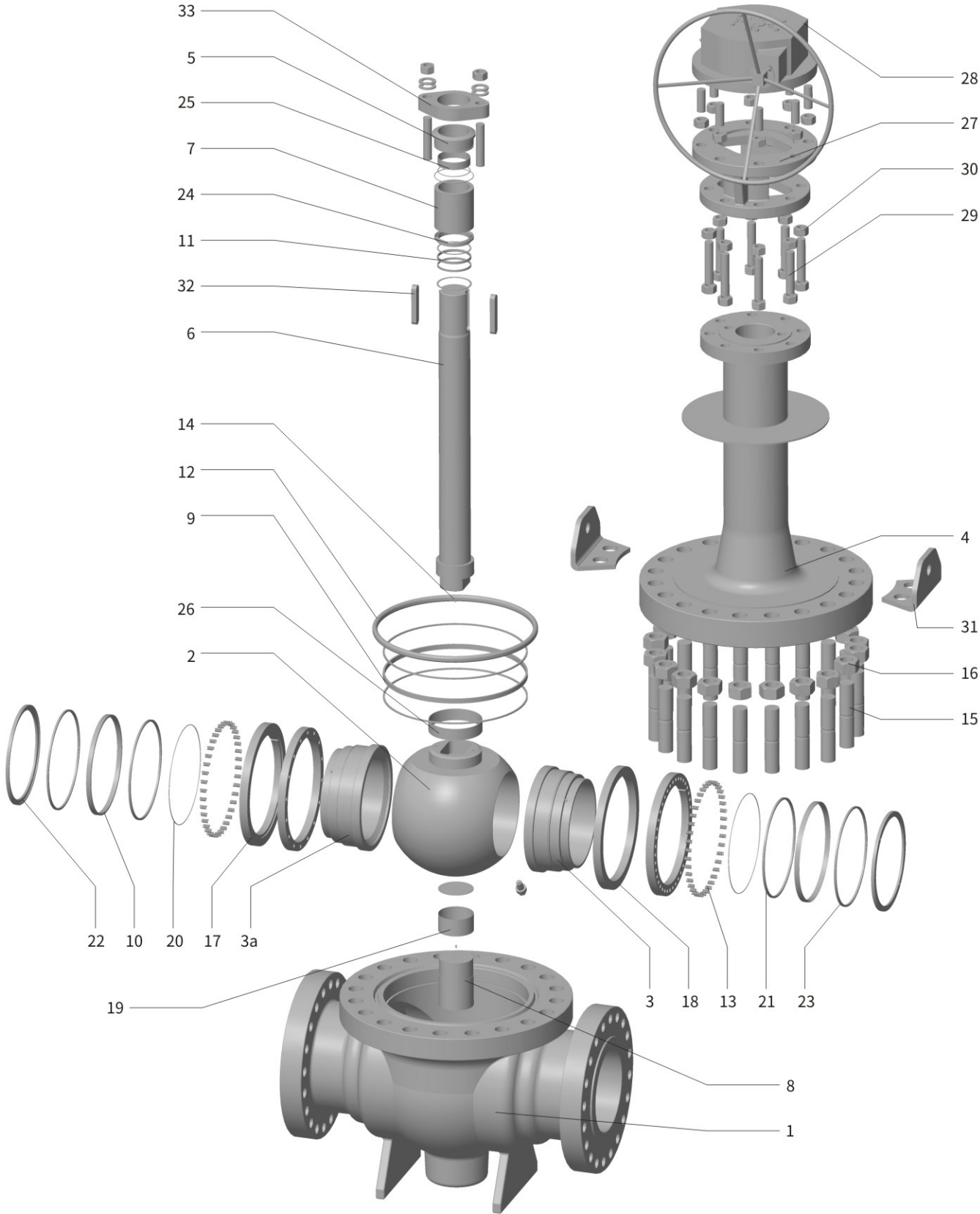
Pressure relief mechanism

The valve stem is equipped with a pressure relief hole to ensure that the extended design is connected to the middle chamber and the valve seat has a self pressure relief function. When the low-temperature medium is trapped in the valve cavity, pressure can be released through these pressure relief holes to prevent the cavity does not become over pressured.

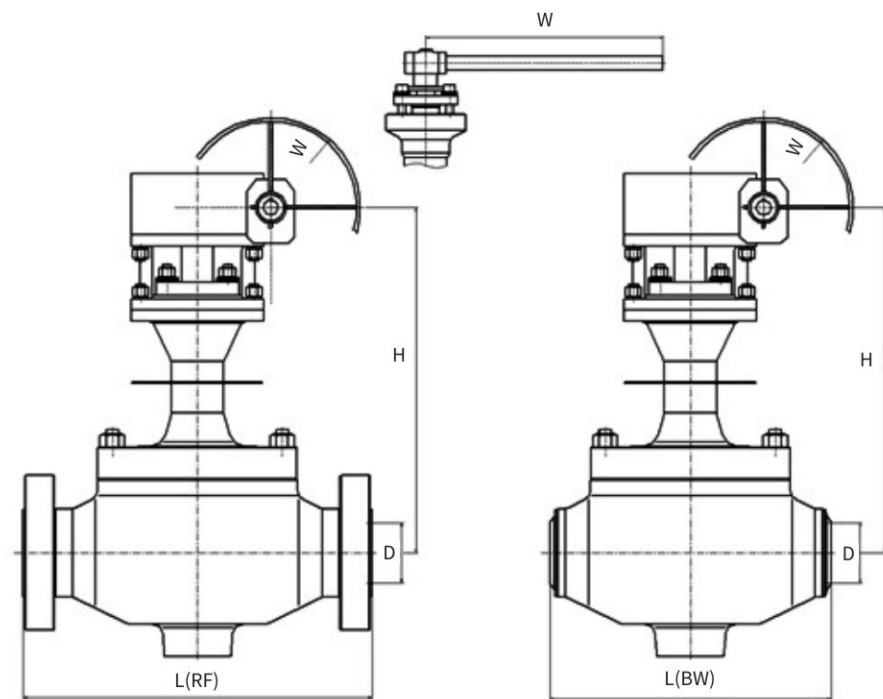


TOP ENTRY CRYOGENIC TRUNNION MOUNTED BALL VALVE

| ITEM | DESCRIPTION         | MATERIAL              |
|------|---------------------|-----------------------|
| 1    | Ball                | A351 CF8M             |
| 2    | Ball                | A182 F316             |
| 3    | Seat                | A182 F316             |
| 3a   | Seat insert         | PCTFE                 |
| 4    | Cover               | A351 CF8M             |
| 5    | Gland ring          | A561 630              |
| 6    | Stem                | A182 F316             |
| 7    | Packing             | Flexible graphite+316 |
| 8    | Lower stem          | A182 F316             |
| 9    | Seal ring           | PTFE+Elgiloy          |
| 10   | Seal ring           | PTFE+Elgiloy          |
| 11   | Seal ring           | PTFE+Elgiloy          |
| 12   | Oval gasket         | A276 316              |
| 13   | Spring              | INCONEL X-718         |
| 14   | Anti-static spring  | A276 316              |
| 15   | Full threaded stud  | A193 B8M CLASS 2      |
| 16   | Nut                 | A194 8MA              |
| 17   | Spring support ring | A182 F316             |
| 18   | Seat adjust Nut     | B124 C61900           |
| 19   | Bearing             | SS+PTFE               |
| 20   | Packing             | Flexible graphite+316 |
| 21   | Seat retainer       | PCTFE                 |
| 22   | Seat metal retainer | A276 316              |
| 23   | Seat retainer       | PCTFE                 |
| 24   | Packing pad         | A276 316              |
| 25   | Bearing             | RPTFE                 |
| 26   | Bearing             | SS+PTFE               |
| 27   | Yoke                | A216 WCB+ENP          |
| 28   | Worm gear           | Ductile iron          |
| 29   | Full threaded stud  | A193 B8M CLASS 2      |
| 30   | Nut                 | A194 8MA              |
| 31   | Lifting ring        | A351 Cf8              |
| 32   | Key                 | AISI 1045             |
| 33   | Gland flange        | A276 316              |



MAIN DIMENSIONS AND WEIGHT OF TOP ENTRY  
CRYOGENIC TRUNNION MOUNTED BALL VALVE



| CLASS 150/PN 20 |     |     |       |       |      |     |           |              |
|-----------------|-----|-----|-------|-------|------|-----|-----------|--------------|
| NPS             | DN  | D   | L(BW) | L(RF) | H*   | W   | Cv        | WT(Forging)* |
|                 |     | mm  | mm    | mm    | mm   | mm  | Usgal/min | kg           |
| 2               | 50  | 49  | 292   | 292   | 456  | 350 | 647       | 50           |
| 3               | 80  | 74  | 356   | 356   | 583  | 400 | 2086      | 105          |
| 4               | 100 | 100 | 432   | 432   | 610  | 350 | 2694      | 146          |
| 6               | 150 | 150 | 559   | 559   | 845  | 600 | 6062      | 308          |
| 8               | 200 | 201 | 660   | 660   | 890  | 600 | 10885     | 509          |
| 10              | 250 | 252 | 787   | 787   | 984  | 600 | 17109     | 663          |
| 12              | 300 | 303 | 838   | 838   | 1038 | 600 | 24734     | 1060         |
| 14              | 350 | 334 | 889   | 889   | 1123 | 600 | 30055     | 1594         |
| 16              | 400 | 385 | 991   | 991   | 1168 | 600 | 39934     | 2043         |
| 20              | 500 | 487 | 1194  | 1194  | 1289 | 600 | 63865     | 3213         |
| 24              | 600 | 589 | 1397  | 1397  | 1369 | 600 | 96465     | 4812         |
| 26              | 650 | 633 | 1448  | 1448  | 1459 | 600 | 107706    | 4613         |
| 28              | 700 | 684 | 1549  | 1549  | 1499 | 600 | 125760    | 5510         |
| 30              | 750 | 735 | 1651  | 1651  | 1539 | 600 | 145213    | 6172         |
| 32              | 800 | 779 | 1778  | 1778  | 1592 | 600 | 163119    | 7864         |
| 36              | 900 | 874 | 2083  | 2083  | 1718 | 600 | 205330    | 10615        |

4" and above are worm gear operations, and the values marked with \* are reference values

| CLASS 300/PN 50 |     |     |       |       |      |     |           |              |
|-----------------|-----|-----|-------|-------|------|-----|-----------|--------------|
| NPS             | DN  | D   | L(BW) | L(RF) | H*   | W   | Cv        | WT(Forging)* |
|                 |     | mm  | mm    | mm    | mm   | mm  | Usgal/min | kg           |
| 2               | 50  | 49  | 292   | 292   | 456  | 430 | 647       | 50           |
| 3               | 80  | 74  | 356   | 356   | 583  | 500 | 2086      | 105          |
| 4               | 100 | 100 | 432   | 432   | 610  | 350 | 2694      | 146          |
| 6               | 150 | 150 | 559   | 559   | 845  | 600 | 6062      | 308          |
| 8               | 200 | 201 | 660   | 660   | 890  | 600 | 10885     | 509          |
| 10              | 250 | 252 | 787   | 787   | 984  | 600 | 17109     | 663          |
| 12              | 300 | 303 | 838   | 838   | 1038 | 600 | 24734     | 1060         |
| 14              | 350 | 334 | 889   | 889   | 1123 | 600 | 30055     | 1594         |
| 16              | 400 | 385 | 991   | 991   | 1168 | 600 | 39934     | 2043         |
| 20              | 500 | 487 | 1194  | 1194  | 1289 | 600 | 63865     | 3213         |
| 24              | 600 | 589 | 1397  | 1397  | 1369 | 600 | 96465     | 4812         |
| 26              | 650 | 633 | 1448  | 1448  | 1459 | 600 | 107706    | 4613         |
| 28              | 700 | 684 | 1549  | 1549  | 1499 | 600 | 125760    | 5510         |
| 30              | 750 | 735 | 1651  | 1651  | 1539 | 600 | 145213    | 6172         |
| 32              | 800 | 779 | 1778  | 1778  | 1592 | 600 | 163119    | 7864         |
| 36              | 900 | 874 | 2083  | 2083  | 1718 | 600 | 205330    | 10615        |

4" and above are worm gear operations, and the values marked with \* are reference values

| CLASS 600/PN 100 |     |     |       |       |      |     |           |              |
|------------------|-----|-----|-------|-------|------|-----|-----------|--------------|
| NPS              | DN  | D   | L(BW) | L(RF) | H*   | W   | Cv        | WT(Forging)* |
|                  |     | mm  | mm    | mm    | mm   | mm  | Usgal/min | kg           |
| 2                | 50  | 49  | 292   | 292   | 466  | 550 | 647       | 0            |
| 3                | 80  | 74  | 356   | 356   | 597  | 460 | 2086      | 0            |
| 4                | 100 | 100 | 432   | 432   | 641  | 460 | 2694      | 0            |
| 6                | 150 | 150 | 559   | 559   | 899  | 600 | 6062      | 0            |
| 8                | 200 | 201 | 660   | 660   | 943  | 600 | 10885     | 0            |
| 10               | 250 | 252 | 787   | 787   | 1056 | 600 | 17109     | 0            |
| 12               | 300 | 303 | 838   | 838   | 1091 | 600 | 24734     | 0            |
| 14               | 350 | 334 | 889   | 889   | 1172 | 600 | 30055     | 0            |
| 16               | 400 | 385 | 991   | 991   | 1230 | 600 | 39934     | 0            |
| 20               | 500 | 487 | 1194  | 1194  | 1369 | 600 | 63865     | 0            |
| 24               | 600 | 589 | 1397  | 1397  | 1458 | 600 | 96465     | 0            |
| 26               | 650 | 633 | 1448  | 1448  | 1561 | 600 | 107706    | 0            |
| 28               | 700 | 684 | 1549  | 1549  | 1601 | 600 | 125760    | 0            |
| 30               | 750 | 735 | 1651  | 1651  | 1641 | 600 | 145213    | 0            |
| 32               | 800 | 779 | 1778  | 1778  | 1686 | 600 | 163119    | 0            |
| 36               | 900 | 874 | 2083  | 2083  | 1820 | 600 | 205330    | 0            |

3" and above are worm gear operations, and the values marked with \* are reference values

| CLASS 900/PN 150 |     |     |       |       |      |     |           |              |
|------------------|-----|-----|-------|-------|------|-----|-----------|--------------|
| NPS              | DN  | D   | L(BW) | L(RF) | H*   | W   | Cv        | WT(Forging)* |
|                  |     | mm  | mm    | mm    | mm   | mm  | Usgal/min | kg           |
| 2                | 50  | 49  | 368   | 368   | 501  | 360 | 645       | 150          |
| 3                | 80  | 74  | 381   | 381   | 619  | 460 | 1472      | 191          |
| 4                | 100 | 100 | 457   | 457   | 654  | 600 | 2688      | 310          |
| 6                | 150 | 150 | 610   | 610   | 917  | 600 | 6048      | 719          |
| 8                | 200 | 201 | 737   | 737   | 979  | 600 | 10860     | 1203         |
| 10               | 250 | 252 | 838   | 838   | 1082 | 600 | 17070     | 1751         |
| 12               | 300 | 303 | 965   | 965   | 1127 | 600 | 24678     | 2413         |
| 14               | 350 | 322 | 1029  | 1029  | 1199 | 600 | 27870     | 2863         |
| 16               | 400 | 373 | 1130  | 1130  | 1244 | 600 | 37398     | 3627         |
| 20               | 500 | 471 | 1321  | 1321  | 1400 | 600 | 59631     | 5857         |
| 24               | 600 | 570 | 1549  | 1549  | 1529 | 600 | 87333     | 9591         |
| 26               | 650 | 617 | -     | 1651  | 1610 | 600 | 102329    | 11035        |
| 30               | 750 | 712 | -     | 1880  | 1712 | 600 | 136267    | 15629        |
| 36               | 900 | 855 | -     | 2286  | 1922 | 600 | 196500    | 26178        |

2" and above are worm gear operations, and the values marked with \* are reference values

| CLASS 1500/PN 250 |     |     |       |       |      |     |           |              |
|-------------------|-----|-----|-------|-------|------|-----|-----------|--------------|
| NPS               | DN  | D   | L(BW) | L(RF) | H*   | W   | Cv        | WT(Forging)* |
|                   |     | mm  | mm    | mm    | mm   | mm  | Usgal/min | kg           |
| 2                 | 50  | 49  | 368   | 368   | 501  | 360 | 645       | 150          |
| 3                 | 80  | 74  | 470   | 470   | 619  | 460 | 1472      | 262          |
| 4                 | 100 | 100 | 546   | 546   | 654  | 600 | 2688      | 402          |
| 6                 | 150 | 144 | 705   | 705   | 917  | 600 | 5574      | 899          |
| 8                 | 200 | 192 | 832   | 832   | 979  | 600 | 9909      | 1450         |
| 10                | 250 | 239 | 991   | 991   | 1082 | 600 | 15354     | 2268         |
| 12                | 300 | 287 | 1130  | 1130  | 1127 | 600 | 22141     | 3091         |
| 14                | 350 | 315 | 1257  | 1257  | 1199 | 600 | 26672     | 3871         |
| 16                | 400 | 360 | 1384  | 1384  | 1244 | 600 | 34836     | 4948         |
| 20                | 500 | 454 | -     | 1664  | 1400 | 600 | 55404     | 8312         |
| 26                | 650 | 594 | -     | 1943  | 1560 | 600 | 94842     | 13987        |

2" and above are worm gear operations, and the values marked with \* are reference values