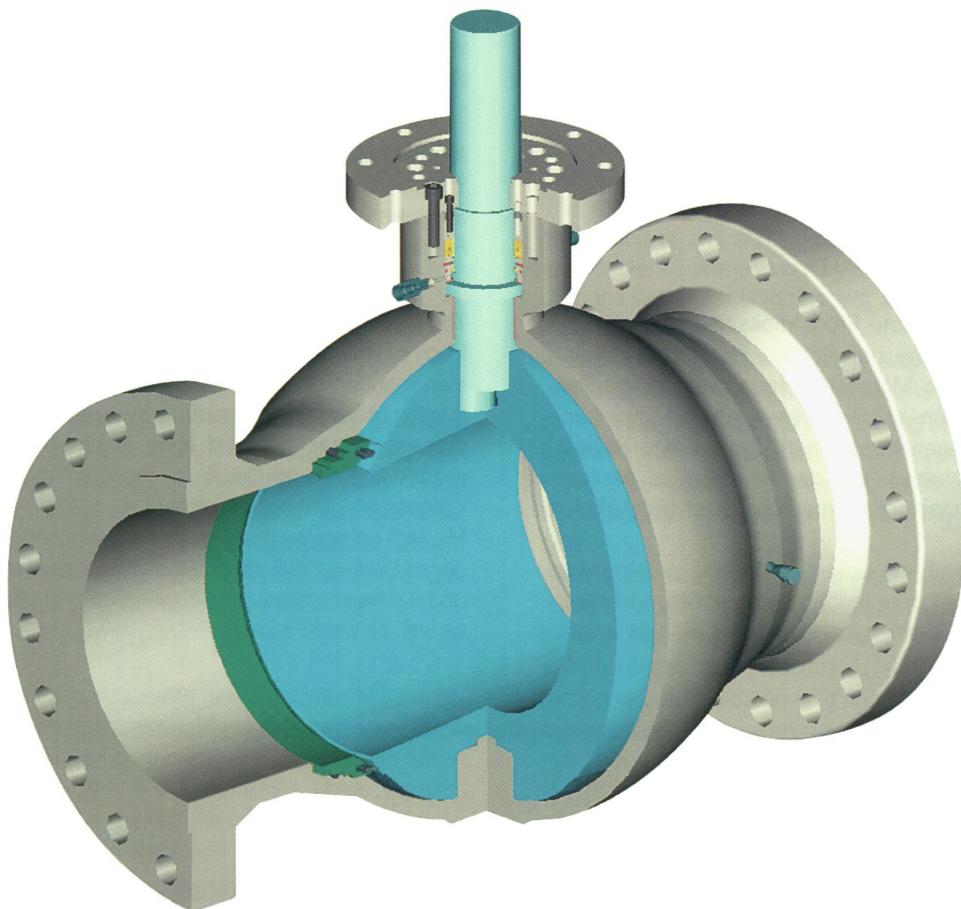
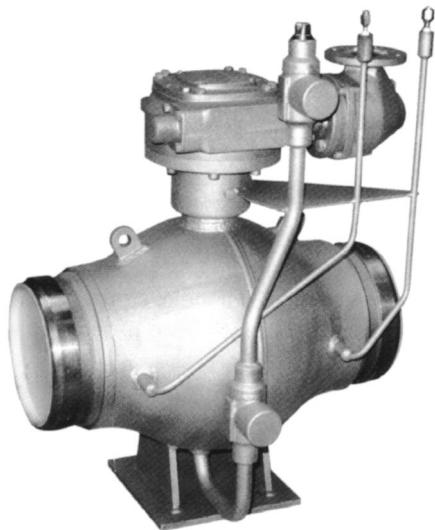


## **BALL VALVE** **Type HKSF-W**





### Description of construction

The RMA ball valves of the HKSF-W type are of fully welded, maintenance-free design.

HKSF-W ball valves are available in three models:

#### **Soft sealing**

#### **Primary metal and secondary soft sealing**

#### **Metal-to-metal sealing**

In case of **soft sealing**, a special designed soft sealing ring provides the contact between the ball and the seating ring. The soft sealing ring is set into the seating ring and is held in place by an insert groove. The seating ring on both the inlet and the outlet side are pre-pressed by springs onto the ball. When the operating pressure increases, the contact force of the seating ring, and consequently the soft sealing, against the ball increases accordingly.

The **primary metal and secondary soft sealing** method, using the proven RMA sealing system, offers the following advantages: The metal seating rings on both the inlet and outlet sides are composed of sealing planes made of chrome steel. These are constantly pre-pressed by springs and the medium pressure onto the ball surface. In this way a pure metal sealing is formed.

In case of damage to the metal sealing planes, the soft sealing rings enters into effect. This is achieved by increasing the pressure of the reverse side of the soft sealing ring which is pressed onto the ball in dependence of the medium pressure.

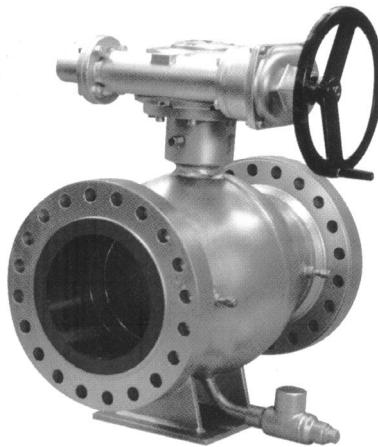
For this activation it is irrelevant whether the leakage is due to the metal sealing plane on the housing side or on the medium side.

When the operating pressure increases the contact force of the metal sealing rings versus the ball also intensified. Even at high operating pressures, the flexible soft sealing ring suffers no damage. Guard rings are used to prevent ejection or forcing out of the soft sealing ring at all pressure stages and in all switch positions.

The primary metal and secondary soft sealing principle is based on the precision machining of metal sealing ball valves (e.g. common lapping of ball and sealing rings).

In the **metal-to-metal sealing system**, the additional soft sealing in the seating rings is excluded. Sealing is achieved exclusively via the chrome steel seating plane and the ball.

On request, a third, **emergency sealing system** (sealing compound system) can be added to both seating rings as well as to the spindle sleeve. For this reason a special chambering groove is incorporated in the seating rings to enable a pre-defined emergency sealing.



#### **Double block and bleed**

Proof of sealing is provided in both end positions, even under maximum operating pressure of the ball valve, using a special, self-protected bleed nipple or, if required, using drain and vent pipes with an additional ball valve.

RMA ball valves are available in two sealing types: single-piston and double-piston seating ring systems.

In the **single-piston** system, the sealing ring on the outlet side raises when a pre-defined over-pressure is present inside the valve housing thus allowing this excess pressure to escape to the outlet side. The lack of pressure within the housing provides proof of sealing.

In the **double-piston** system, the seals and seating rings on the inlet and outlet side provide total sealing of the housing inner chamber in both end positions of the ball valve. The ball valve is tightening to the inlet and to the outlet side. In this way it is also possible to provide proof of sealing by pressurization from outside the housing.

#### **Ball bearings**

RMA ball valves are trunnion mounted with maintenance-free bearings in all sizes and pressure ratings.

The precision machining and special lowfriction bearings ensure minimum wear. This particularly advantageous for the resistance and smooth operating of ball valve as well as associated gearboxes and motors in high pressure zones when switching takes place in pipelines under full pressure.

#### **Electrostatic charge**

An electric conductive connection between ball and housing provides reliable prevention of electrostatic buildup.

#### **Spindle/sealing**

The antiblowout design prevents the spindle from being blown out by the medium transported or pulled out by the user himself.

The special double-screw design enables, on the one hand, correct squeezing or adjustment of the steel, PTFE and graphite sealing system manufactured by RMA and on the other hand, rapid replacement of sealing rings under full operating pressure.

#### **Connection**

Inline connection on site can be ensured either with flange ends, in accordance with standard requirements, or with all welding ends gauged to correspond to the pipes to be connected. Specific customer requirements may be taken into consideration.

#### **Fire protection**

RMA ball valves offer the high fire protection level required in oil, gas and supply pipelines.  
(e.g. API 6FA, API 607, BS 6755 Part 2)

## Materials

For the standard model of the type HKSF-W, materials in accordance with DIN, ASME and NACE MR 01 75 are used.

## Vent and drain

In accordance with the known relevant group standards, RMA ball valves are equipped with vent and drain pipes with additional RMA ball valves, if needed with pressure resistance cap and/or with RMA rotary gate valves on request or due to technical necessity.

## Scope of application

Surface or underground mounted, for use in:

Transport lines, compressor stations, measure and regulating stations, drain or vent pipes on pig traps or other installations. RMA ball valves are suitable for use within a wide range of mediums e.g.: gas, oil....

## Design

The housing is extremely rigid thanks to its fully-welded ball design form.

The largely dimensioned ball diameter ensures a high level of overlapping of the sealing surface in the fully-closed position with a consequently high level of sealing security.

In addition, the design form prevents turbulence in the medium transported which also helps limit premature wear. The low weight and minimum number of weld seams are further advantages of this design.

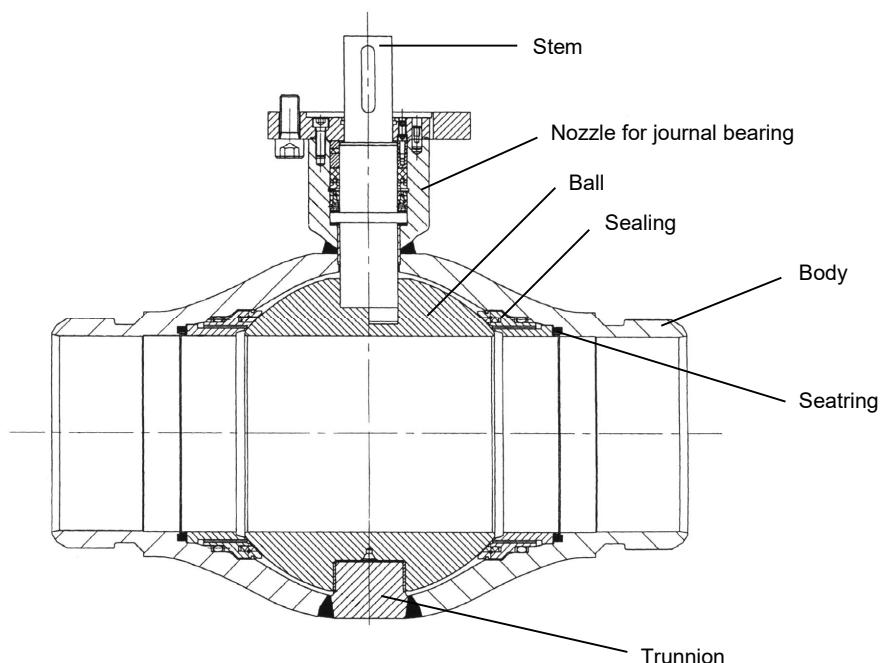
## Operating

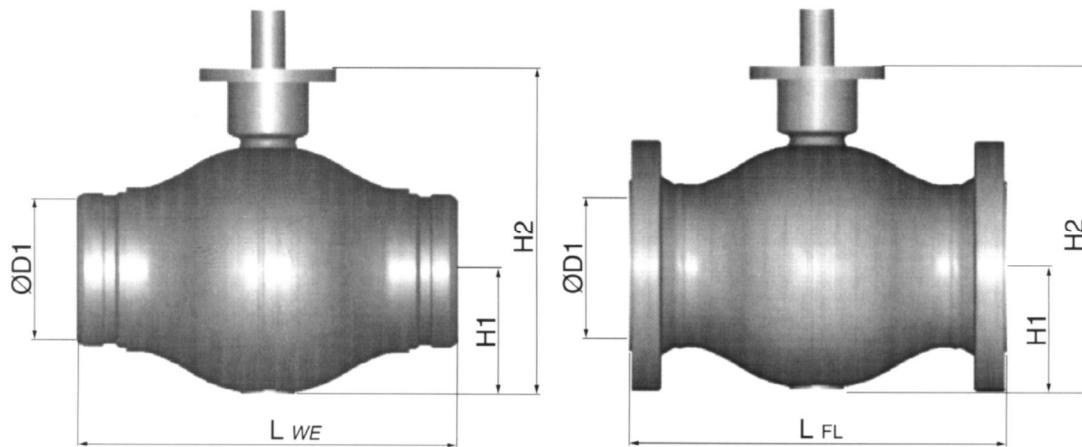
RMA ball valves are available with hand, geared, electrical, electro-hydraulic, hydro-pneumatic or any other operating mechanism.

Diverse accessories, like position indicators, remote control operations etc. can be added.

## Temperature range

The operating temperature for standard RMA ball valves extends from -29°C to +120°C.





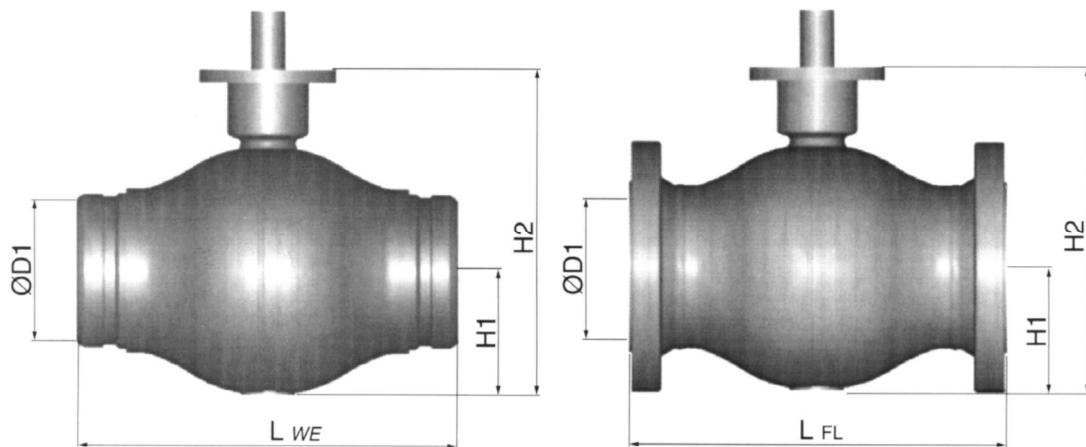
| <b>ANSI Class 150 - PN 16 Full bore</b> |                    |                   |                   |                              |                              |
|---|--------------------|-------------------|-------------------|------------------------------|------------------------------|
| <b>Size</b>                             | <b>Diameter</b>    | <b>Height</b>     | <b>Height</b>     | <b>Length</b>                | <b>Length</b>                |
| <b>DN<br/>mm/inch</b>                   | <b>Ø D1<br/>mm</b> | <b>H 1<br/>mm</b> | <b>H 2<br/>mm</b> | <b>L<sub>WE</sub><br/>mm</b> | <b>L<sub>FL</sub><br/>mm</b> |
| 25/1"                                   | 25                 | 45                | 90                | 126                          | 160                          |
| 50/2"                                   | 51                 | 60                | 150               | 216                          | 178                          |
| 80/3"                                   | 76                 | 110               | 220               | 283                          | 203                          |
| 100/4"                                  | 102                | 130               | 260               | 305                          | 229                          |
| 150/6"                                  | 152                | 190               | 380               | 457                          | 394                          |
| 200/8"                                  | 203                | 230               | 510               | 521                          | 457                          |
| 250/10"                                 | 254                | 290               | 610               | 559                          | 53                           |
| 300/12"                                 | 305                | 320               | 700               | 635                          | 610                          |
| 400/16"                                 | 387                | 350               | 840               | 838                          | 762                          |
| 500/20"                                 | 489                | 430               | 980               | 991                          | 914                          |
| 600/24"                                 | 591                | 490               | 1170              | 1143                         | 1067                         |
| 700/28"                                 | 686                | 560               | 1260              | 1346                         | 1245                         |
| 800/32"                                 | 781                | 635               | 1410              | 1524                         | 1372                         |
| 900/36"                                 | 876                | 710               | 1580              | 1727                         | 1524                         |
| 1000/40"                                | 978                | 780               | 1740              | 1803                         | 1727                         |
| 1100/44"                                | 1067               | 855               | 1895              | 1956                         | 1905                         |
| 1200/48"                                | 1168               | 945               | 2085              | 2134                         | 2057                         |
| 1400/56"                                | 1384               | 1110              | 2410              | 2489                         | 2362                         |

Continuous expanding of production range. Please ask for deviating sizes and dimensions.

### Remarks

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

ANSI Class 300  
PN 40  
Full bore



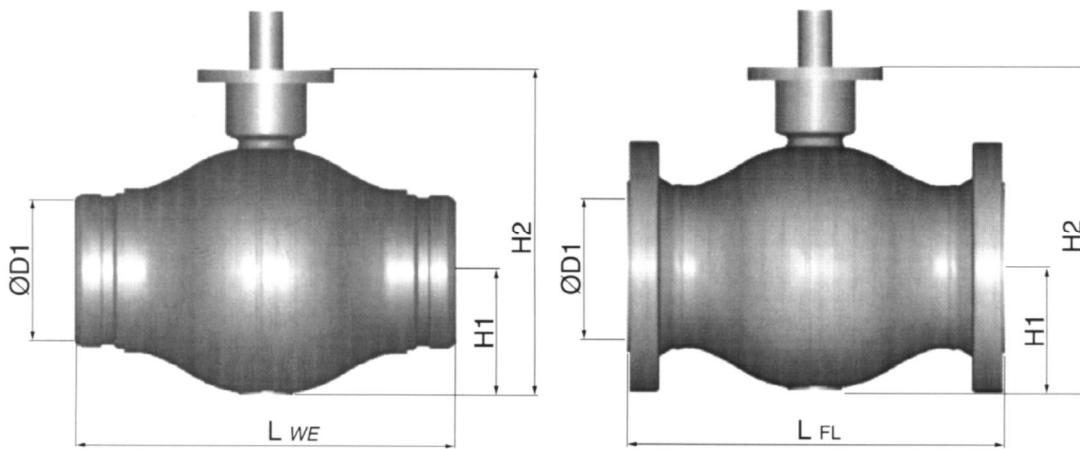
**ANSI Class 300 - PN 40 Full bore**

| Size          | Diameter   | Height    | Height    | Length     | Length     |
|---------------|------------|-----------|-----------|------------|------------|
| DN<br>mm/inch | Ø D1<br>mm | H 1<br>mm | H 2<br>mm | L WE<br>mm | L FL<br>mm |
| 25/1"         | 25         | 70        | 155       | 216        | 216        |
| 50/2"         | 51         | 95        | 185       | 216        | 216        |
| 80/3"         | 76         | 110       | 240       | 285        | 283        |
| 100/4"        | 102        | 130       | 290       | 305        | 305        |
| 150/6"        | 152        | 190       | 395       | 457        | 403        |
| 200/8"        | 203        | 235       | 525       | 521        | 502        |
| 250/10"       | 254        | 290       | 630       | 559        | 568        |
| 300/12"       | 305        | 335       | 720       | 635        | 648        |
| 400/16"       | 387        | 380       | 880       | 838        | 838        |
| 500/20"       | 489        | 450       | 1060      | 991        | 991        |
| 600/24"       | 591        | 505       | 1200      | 1143       | 1143       |
| 700/28"       | 686        | 580       | 1280      | 1346       | 1346       |
| 800/32"       | 781        | 655       | 1440      | 1524       | 1524       |
| 900/36"       | 876        | 730       | 1590      | 1727       | 1727       |
| 1000/40"      | 978        | 790       | 1765      | 1803       | 1803       |
| 1100/44"      | 1067       | 870       | 1925      | 1956       | 1956       |
| 1200/48"      | 1168       | 950       | 2105      | 2134       | 2134       |
| 1400/56"      | 1384       | 1135      | 2455      | 2489       | 2489       |

Continuous expanding of production range. Please ask for deviating sizes and dimensions.

**Remarks**

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.



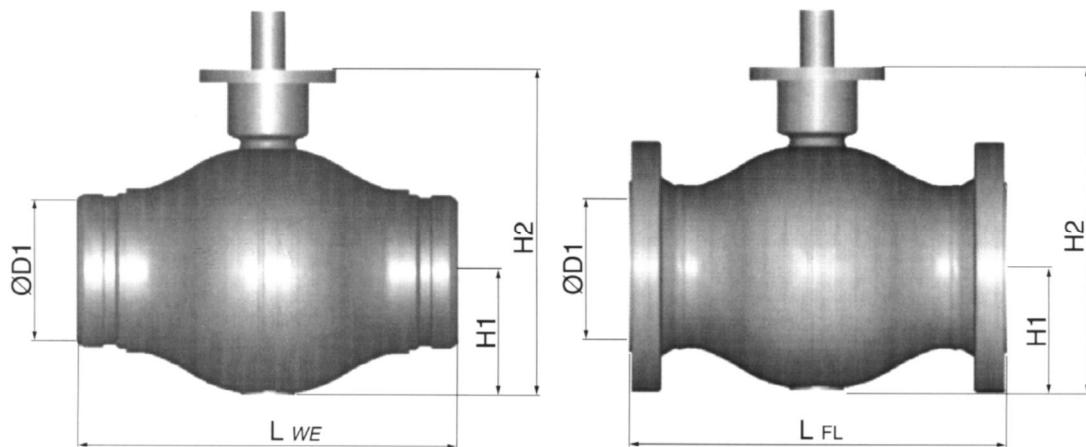
| <b>ANSI Class 600 - PN 100 Full bore</b> |                    |                   |                   |                              |                              |
|--|--------------------|-------------------|-------------------|------------------------------|------------------------------|
| <b>Size</b>                              | <b>Diameter</b>    | <b>Height</b>     | <b>Height</b>     | <b>Length</b>                | <b>Length</b>                |
| <b>DN<br/>mm/inch</b>                    | <b>Ø D1<br/>mm</b> | <b>H 1<br/>mm</b> | <b>H 2<br/>mm</b> | <b>L<sub>WE</sub><br/>mm</b> | <b>L<sub>FL</sub><br/>mm</b> |
| 25/1"                                    | 25                 | 70                | 155               | 216                          | 216                          |
| 50/2"                                    | 51                 | 95                | 185               | 292                          | 292                          |
| 80/3"                                    | 76                 | 110               | 240               | 356                          | 356                          |
| 100/4"                                   | 102                | 130               | 290               | 432                          | 432                          |
| 150/6"                                   | 152                | 190               | 395               | 559                          | 559                          |
| 200/8"                                   | 203                | 235               | 525               | 660                          | 660                          |
| 250/10"                                  | 254                | 290               | 630               | 787                          | 787                          |
| 300/12"                                  | 305                | 335               | 720               | 838                          | 838                          |
| 400/16"                                  | 387                | 380               | 880               | 991                          | 991                          |
| 500/20"                                  | 489                | 450               | 1060              | 1194                         | 1194                         |
| 600/24"                                  | 591                | 505               | 1200              | 1397                         | 1397                         |
| 700/28"                                  | 686                | 580               | 1280              | 1549                         | 1549                         |
| 800/32"                                  | 781                | 655               | 1440              | 1778                         | 1778                         |
| 900/36"                                  | 876                | 730               | 1590              | 2083                         | 2083                         |
| 1000/40"                                 | 978                | 790               | 1765              | 2159                         | 2159                         |
| 1100/44"                                 | 1067               | 870               | 1925              | 2311                         | 2311                         |
| 1200/48"                                 | 1168               | 950               | 2105              | 2489                         | 2489                         |
| 1400/56"                                 | 1384               | 1135              | 2455              | 2921                         | 2921                         |

Continuous expanding of production range. Please ask for deviating sizes and dimensions.

### Remarks

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

ANSI Class 900  
PN 150  
Full bore



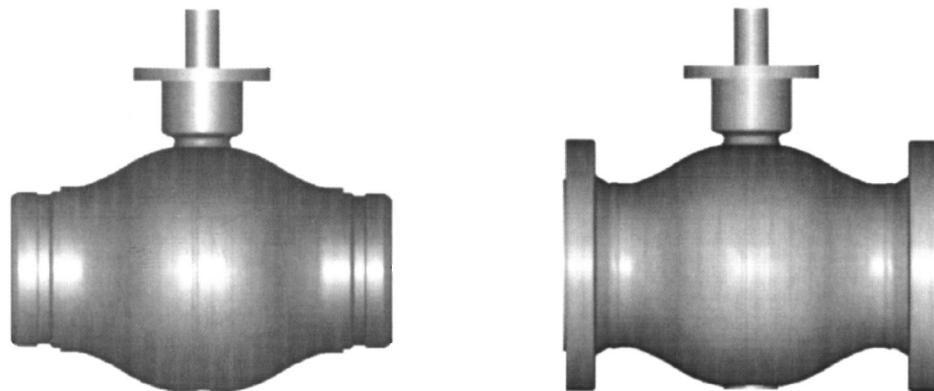
**ANSI Class 900 - PN 150 Full bore**

| Size          | Diameter   | Height    | Height    | Length                | Length                |
|---------------|------------|-----------|-----------|-----------------------|-----------------------|
| DN<br>mm/inch | Ø D1<br>mm | H 1<br>mm | H 2<br>mm | L <sub>WE</sub><br>mm | L <sub>FL</sub><br>mm |
| 25/1"         | 25         | 70        | 155       | 216                   | 216                   |
| 50/2"         | 51         | 95        | 185       | 368                   | 368                   |
| 80/3"         | 76         | 110       | 240       | 381                   | 381                   |
| 100/4"        | 102        | 130       | 290       | 457                   | 457                   |
| 150/6"        | 152        | 190       | 395       | 610                   | 610                   |
| 200/8"        | 203        | 235       | 525       | 737                   | 737                   |
| 250/10"       | 254        | 290       | 630       | 838                   | 838                   |
| 300/12"       | 305        | 335       | 720       | 965                   | 965                   |
| 400/16"       | 375        | 410       | 880       | 1130                  | 1130                  |
| 500/20"       | 473        | 470       | 1080      | 1321                  | 1321                  |
| 600/24"       | 572        | 525       | 1210      | 1549                  | 1549                  |
| 700/28"       | 667        | 605       | 1340      | 1702                  | 1702                  |
| 800/32"       | 762        | 675       | 1470      | 1880                  | 1880                  |
| 900/36"       | 857        | 760       | 1625      | 2134                  | 2134                  |

Continuous expanding of production range. Please ask for deviating sizes and dimensions.

**Remarks**

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.



| <b>Weights</b>        |                                 |                             |                                 |                             |                                  |                             |                                  |                             |
|-----------------------|---------------------------------|-----------------------------|---------------------------------|-----------------------------|----------------------------------|-----------------------------|----------------------------------|-----------------------------|
| <b>Size</b>           | <b>ANSI Class 150<br/>PN 25</b> |                             | <b>ANSI Class 300<br/>PN 40</b> |                             | <b>ANSI Class 600<br/>PN 100</b> |                             | <b>ANSI Class 900<br/>PN 160</b> |                             |
| <b>DN<br/>mm/inch</b> | <b>G<br/>WE<br/>kg</b>          | <b>G<br/>ANSI FL<br/>kg</b> | <b>G<br/>WE<br/>kg</b>          | <b>G<br/>ANSI FL<br/>kg</b> | <b>G<br/>WE<br/>kg</b>           | <b>G<br/>ANSI FL<br/>kg</b> | <b>G<br/>WE<br/>kg</b>           | <b>G<br/>ANSI FL<br/>kg</b> |
| 25/1"                 | 7                               | 10                          | 7                               | 10                          | 9                                | 13                          | 9                                | 13                          |
| 50/2"                 | 10                              | 12                          | 10                              | 13                          | 14                               | 19                          | 14                               | 19                          |
| 80/3"                 | 24                              | 29                          | 24                              | 31                          | 27                               | 37                          | 27                               | 38                          |
| 100/4"                | 34                              | 49                          | 34                              | 51                          | 35                               | 69                          | 35                               | 70                          |
| 150/6"                | 75                              | 97                          | 75                              | 115                         | 79                               | 1540                        | 85                               | 175                         |
| 200/8"                | 200                             | 230                         | 205                             | 260                         | 211                              | 323                         | 220                              | 370                         |
| 250/10"               | 335                             | 375                         | 340                             | 433                         | 351                              | 539                         | 420                              | 610                         |
| 300/12"               | 490                             | 550                         | 505                             | 654                         | 513                              | 705                         | 560                              | 870                         |
| 400/16"               | 625                             | 721                         | 655                             | 836                         | 836                              | 1190                        | 980                              | 1350                        |
| 500/20"               | 1092                            | 1233                        | 1123                            | 1413                        | 1238                             | 1695                        | 1710                             | 2300                        |
| 600/24"               | 1750                            | 1971                        | 1799                            | 2220                        | 1848                             | 2660                        | 2860                             | 3950                        |
| 700/28"               | 2730                            | 2959                        | 2806                            | 3394                        | 2870                             | 3890                        | 4250                             | 5550                        |
| 800/32"               | 3958                            | 4314                        | 4079                            | 4823                        | 4220                             | 5561                        | 6010                             | 7880                        |
| 900/36"               | 5680                            | 6'078                       | 5742                            | 6686                        | 6230                             | 7720                        | 8344                             | 10850                       |
| 1000/40"              | 7178                            | 7832                        | 7278                            | 8342                        | 9813                             | 10485                       | -                                | -                           |
| 1100/44"              | 9553                            | 10439                       | 9798                            | 10684                       | 11874                            | 13680                       | -                                | -                           |
| 1200/48"              | 12412                           | 13504                       | 12615                           | 13707                       | 15306                            | 17722                       | -                                | -                           |
| 1400/56"              | 21154                           | 22432                       | 21297                           | 22995                       | 24277                            | 28433                       | -                                | -                           |

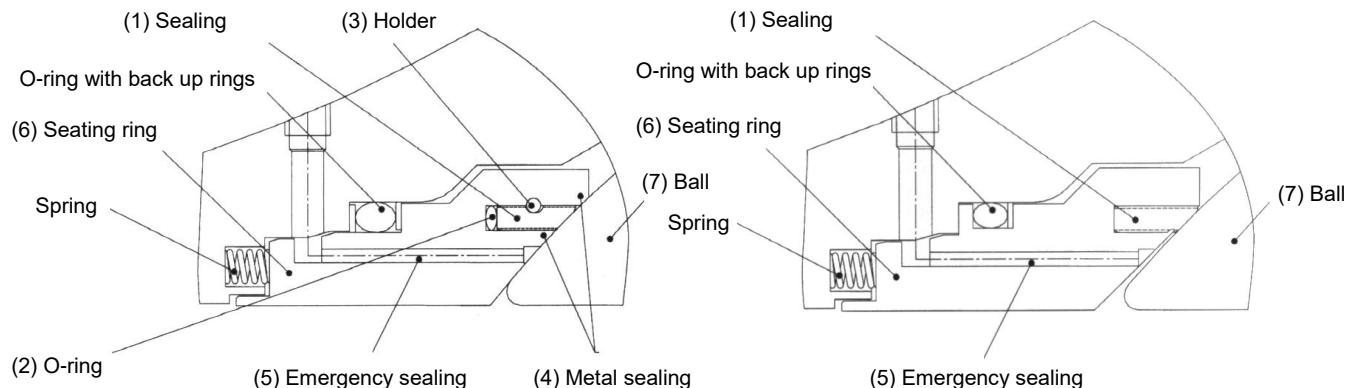
Continuous expanding of production range. Please ask for deviating sizes and dimensions.

### Remarks

- Weights of flanged ball valves with ANSI flanges with flat sealing plane type RF
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves according to ANSI Class 400 on request.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

with primary metal and secondary soft sealing

with soft sealing



#### The primary metal and secondary soft sealing system comprises

- 2 metal sealing planes (chrome steel), other types on request (4)
- 1 flexible soft sealing ring (PTFE/carbon), other types on request (1)
- 1 emergency sealing facility on request (special chamber in the seating ring) (5)

The **soft sealing** (1) is positioned in such a way that is first effective at low operating pressures. As the operating pressure increases, the application force of the **seating ring** (6) on the **ball** (7) increases accordingly (piston effect). The permanent spring force therefore receives additional support. In this case, the **soft sealing ring** (1) is pushed back so far that sealing is achieved entirely with the **metal sealing planes** (4).

In case of damage to the **metal sealing planes** (4), the **soft sealing ring** (1) enters into effect. This is achieved by increasing the pressure of the reverse side of the **soft sealing ring** (1). The latter is pressed into the **ball** (7). For this activation it is irrelevant whether the leakage is due to the **metal sealing plane** (4) on the housing side or on the medium side.

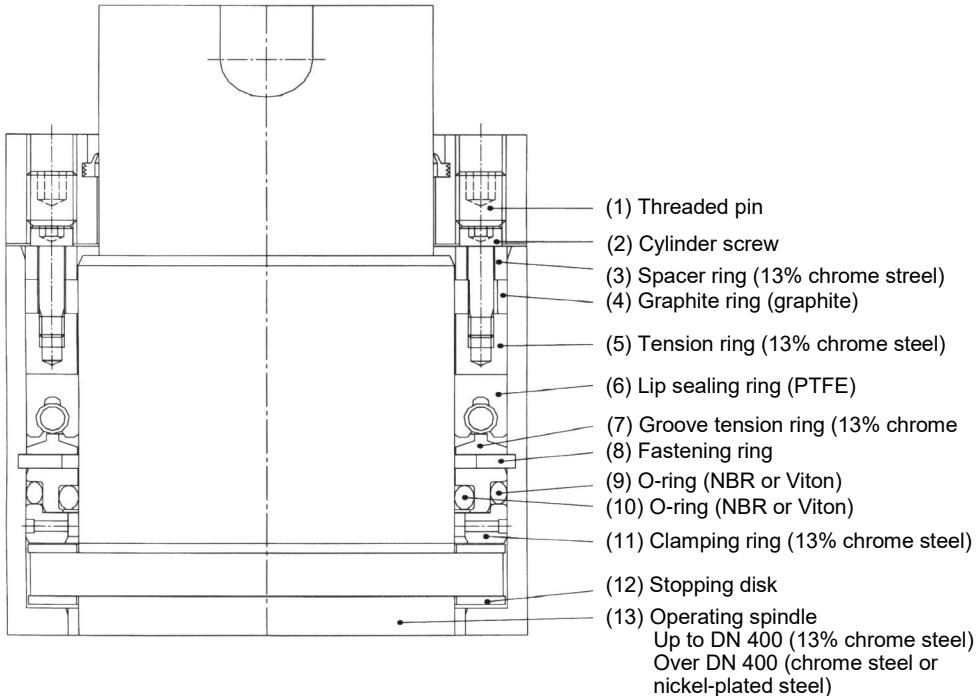
Slipping, extraction, breaking off or other damages to the **soft sealing ring** (1) is virtually not possible.

#### The soft sealing comprises

- 1 flexible soft sealing ring (PTFE/carbon; other types on request) (1)
- emergency sealing facility on request (special chamber in the seating rings) (5)

The **soft sealing ring** (1) is positioned in such a way that it is effective over the entire pressure range. As the operating pressure increases, the application force of the **seating ring** (6) on the **ball** (7) increases accordingly (piston effect). The permanent spring force therefore receives additional support. The application force of the **soft sealing ring** (1) against the **ball** (7) increases proportionally.

Thanks to its *advantageous design form* and the *extremely fine tolerance limits*, slipping, extraction, breaking off or any other type of damage to the **soft sealing ring** (1) is virtually not possible.



Other materials due to technical necessity.

**The sealing system is composed of three seals:**

- Graphite ring (4)
- Lip sealing ring (6)
- O-ring (9+10)

Radial re-tensioning of the lip **sealing ring (6)** is easily achieved by tightening the **threaded pins (1)**. The **graphite ring (4)** can also be re-tensioning by tightening the **cylinder screw (2)** (remove the threaded pins). The **o-ring (10)** and the **lip sealing ring (6)** can be recharged by injecting a sealing compound.

Should it still prove necessary to replace the set of sealing rings, then this task can be carried out with the valve under pressure.

- unscrew the gearbox plate
- replace the set of **sealing rings (4/5/6)**

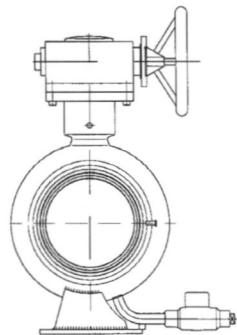
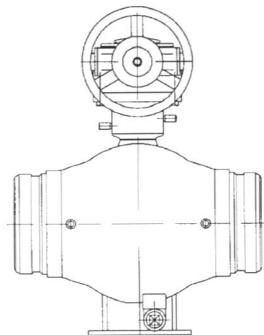
**Note**

Under no circumstances may the **fastening ring (8)** be removed as this is used to ensure axial clamping of the **operating spindle (13)**.

It is recommended that the **o-rings (9+10)** be refilled with a sealing compound before replacing the sealing rings.

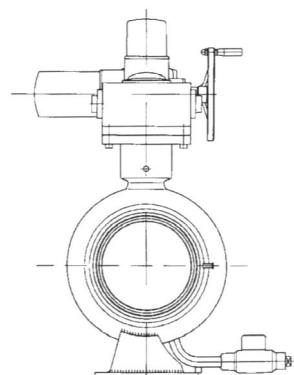
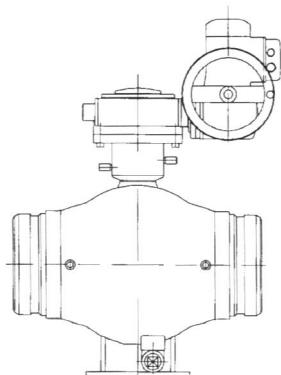
**Some examples for variations  
on equipment, manufactured  
according to customers needs**

**- for *above ground* installation**



**Example 1**

- with welding ends
- incl. gear-box and handwheel
- incl. emergency sealing at
  - a) ball/seating ring
  - b) spindel bearing
- with ball valve for drain and vent
- with support

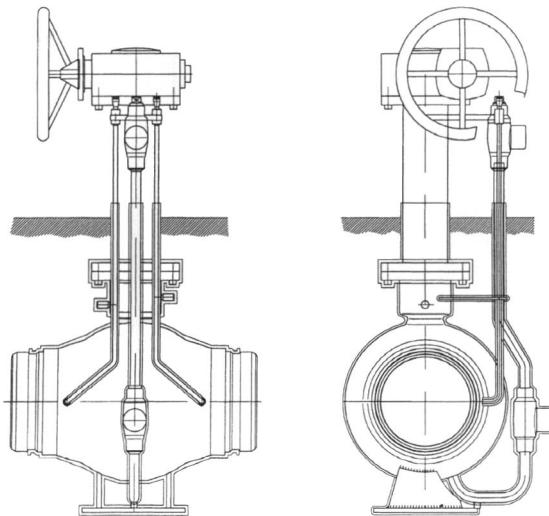


**Example 2**

- with welding ends
- incl. gear-box and motor, push buttons and handwheel for manual operating at side
- incl. emergency sealing at
  - a) ball/seating ring
  - b) spindel bearing
- with ball valve for drain and vent
- with support

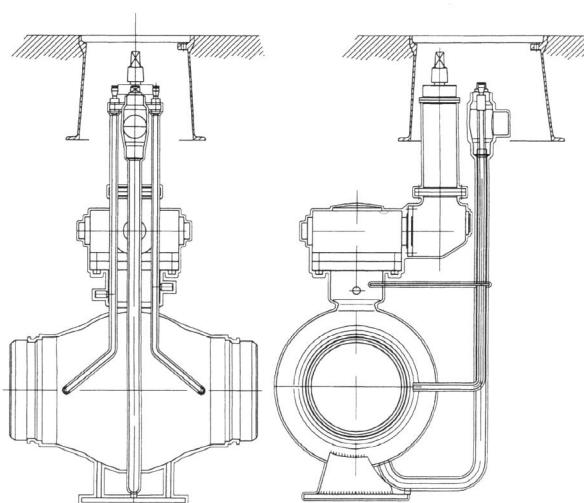
Some examples for variations  
on equipment, manufactured  
according to customers needs

- for *underground* installation



Example 3

- with welding ends
- with stem extention up to operation hight
- incl. gear-box above ground and handwheel
- incl. emergency sealing at
  - a) ball / seating ring  
(accessible above ground)
  - b) spindel bearing
- with possibility of drain and vent above ground through vertical guided pipes with one ball valve above ground and one ball valve underground
- with support
- underground layed parts are coated with PUR. Parts above ground are coated with primer and painted on request.



Example 4

- with welding ends
- with stem extention and actuating square shaft in road cap (a position indicator is recommended)
- incl. gear-box underground
- incl. emergency sealing at
  - a) ball / seating ring  
(accessible through road cap)
  - b) spindel bearing
- with possibility of drain and vent through vertical guided pipes with one ball valve in box of road cap with support
- underground layed parts are coated with PUR.