



# BBF/KSF-V-HE

## UNDERGROUND BALL VALVE WITH WELD ENDS

**DN 25-125 | PN 25**

**FULL BORE**

### INFORMATION

**Ball Valve with weld ends**

/// Ball Valves fulfill the requirements of EN 488 and are suitable for the cold laying method

/// Operating temperature up to +150 °C

/// The square key is included in the scope of delivery.

/// Underground ball valves are delivered unpainted.

**From DN 125:**

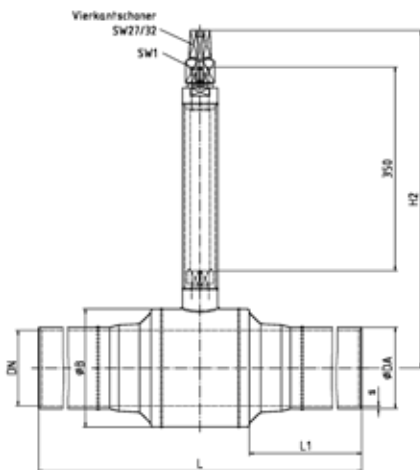
/// Trunnion mounted ball is standard

### MATERIALS

|                   |                      |
|-------------------|----------------------|
| <b>Body</b>       | Forged Steel / Steel |
| <b>Weld Ends</b>  | Steel                |
| <b>Ball</b>       | Stainless steel      |
| <b>Ball Seals</b> | PTFE                 |
| <b>Stem Seals</b> | EPDM                 |

### OPTIONS

- /// Suitable for steam
- /// Additional extensions for adjusting the overlap height and other accessories can be found on the supplementary sheet: „Accessories for buried ball valves“.
- /// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.



| DN [mm] | PN [bar] | DA [mm] | s* [mm] | L [mm] | L1 [mm] | B [mm] | H2 [mm] | SW 1 [mm] | Weight [kg] | Article-No. |
|---------|----------|---------|---------|--------|---------|--------|---------|-----------|-------------|-------------|
| 25      | 25       | 33.7    | 2.3     | 1500   | 717     | 54     | 465     | 16        | 8.0         | 076.0142    |
| 32      | 25       | 42.4    | 2.6     | 1500   | 708.5   | 64     | 488     | 16        | 9.3         | 076.0107    |
| 40      | 25       | 48.3    | 2.6     | 1500   | 706     | 76     | 493     | 16        | 11.0        | 076.0109    |
| 50      | 25       | 60.3    | 2.9     | 1500   | 705.5   | 89     | 501     | 16        | 14.0        | 076.0044    |
| 65      | 25       | 76.1    | 2.9     | 1500   | 691     | 121    | 515     | 16        | 19.0        | 076.0046    |
| 80      | 25       | 88.9    | 3.2     | 1500   | 688     | 140    | 549     | 22        | 25.0        | 076.0048    |
| 100     | 25       | 114.3   | 3.6     | 1500   | 680     | 171    | 562     | 22        | 34.0        | 076.0079    |
| 125     | 25       | 139.7   | 3.6     | 1500   | 665     | 203    | 581     | 22        | 45.0        | 076.0096    |

\* The wall thickness adjustment of the pipe ends is carried out according to dimension s. For the actual pipe wall thicknesses used, please refer to the table on the „Technical Information“ supplement.



# BBF/KSF-V-HE

## UNDERGROUND BALL VALVE WITH WELD ENDS

**DN 150-300 | PN 25**

**FULL BORE**

### INFORMATION

**Ball Valve with weld ends**

/// Ball Valves fulfill the requirements of EN 488 and are suitable for the cold laying method

/// Operating temperature up to +150 °C

/// Underground ball valves are delivered unpainted.

**From DN 150:**

/// The recommended actuation is via a plug-in gear. The required slip-on flange with square key is included in the scope of delivery.

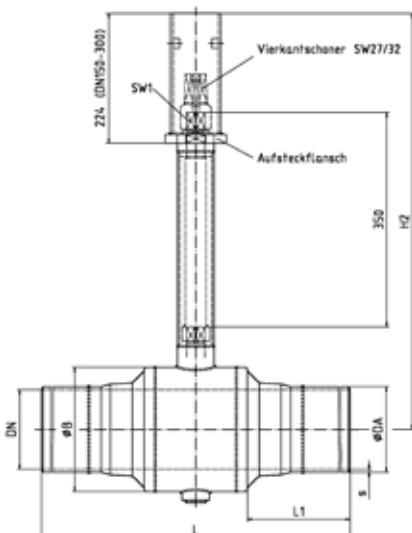
/// Further information on plug-in gearboxes can be found on the supplementary sheet „Accessories for buried ball valves“.

### MATERIALS

|                   |                      |
|-------------------|----------------------|
| <b>Body</b>       | Forged Steel / Steel |
| <b>Weld Ends</b>  | Steel                |
| <b>Ball</b>       | Stainless steel      |
| <b>Ball Seals</b> | PTFE                 |
| <b>Stem Seals</b> | EPDM                 |

### OPTIONS

- /// Suitable for steam
- /// Additional extensions for adjusting the overlap height and other accessories can be found on the supplementary sheet: „Accessories for buried ball valves“.
- /// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.



| DN [mm] | PN [bar] | DA [mm] | s* [mm] | L [mm] | L1 [mm] | B [mm] | H2 [mm] | SW 1 [mm] | Weight [kg] | Article-No. |
|---------|----------|---------|---------|--------|---------|--------|---------|-----------|-------------|-------------|
| 150     | 25       | 168.3   | 4.0     | 1500   | 640.5   | 254    | 725     | 32        | 85          | 076.0098    |
| 200     | 25       | 219.1   | 4.5     | 1500   | 616     | 324    | 760     | 32        | 129         | 076.0105    |
| 250     | 25       | 273.0   | 5.0     | 1500   | 567     | 407    | 900     | 32        | 285         | 076.0113    |
| 300     | 25       | 323.9   | 5.6     | 2000   | 771     | 508    | 942     | 32        | 510         | 076.0115    |

\* The wall thickness adjustment of the pipe ends is carried out according to dimension s. For the actual pipe wall thicknesses used, please refer to the table on the „Technical Information“ supplement.

# BBF/KSF-V-HE

## UNDERGROUND BALL VALVE WITH WELD ENDS

**DN 350-1200 | PN 25**

**FULL BORE**



### INFORMATION

**Ball Valve with weld ends**

/// Ball Valves fulfill the requirements of EN 488 and are suitable for the cold laying method

/// Operating temperature up to +150 °C

/// Trunnion mounted ball is standard

/// Underground ball valves are delivered unpainted.

**From DN 350:**

/// The gear unit and the square key are included in the scope of delivery.

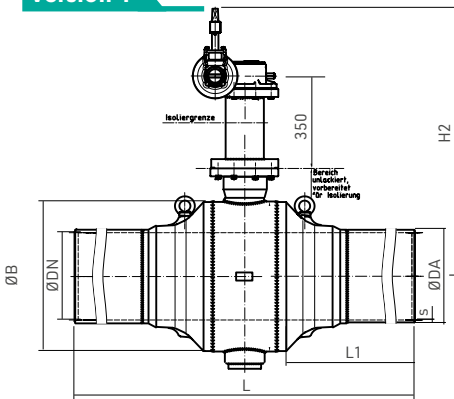
### MATERIALS

|                   |   |
|-------------------|---|
| <b>Body</b>       | Forged Steel / Steel  |
| <b>Weld Ends</b>  | Steel   |
|                   | Stainless steel;<br>From DN 450: Steel<br>chemically nickel<br>plated |
| <b>Ball</b>       |   |
| <b>Ball Seals</b> | PTFE  |
| <b>Stem Seals</b> | EPDM  |

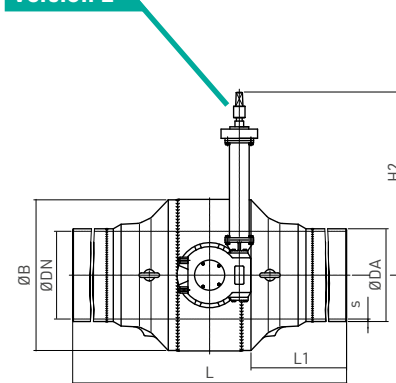
### OPTIONS

- /// Suitable for steam
- /// Additional extensions for adjusting the overlap height (for version 2 and 3) and other accessories can be found on the supplementary sheet: „Accessories for buried ball valves“.
- /// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.

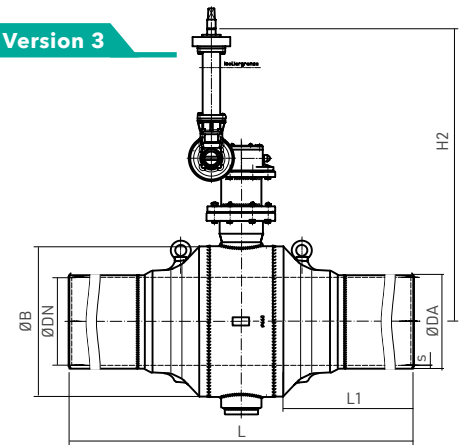
**Version 1**



**Version 2**



**Version 3**



| DN [mm] | PN [bar] | DA [mm] | s* [mm] | L [mm] | L1 [mm] | B [mm] | Weight [kg] | Version 1 |             | Version 2 |             | Version 3 |             |
|---------|----------|---------|---------|--------|---------|--------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
|         |          |         |         |        |         |        |             | H2 [mm]   | Article-No. | H2 [mm]   | Article-No. | H2 [mm]   | Article-No. |
| 350     | 25       | 355.6   | 5.6     | 2000   | 745     | 559    | 750         | 1086      | 076.0117    | 800       | 076.1117    | 1274      | 076.9967    |
| 400     | 25       | 406.4   | 6.3     | 2000   | 819     | 660    | 1030        | 1121      | 076.0119    | 800       | 076.1119    | 1368      | 076.8910    |
| 450     | 25       | 457     | 6.3     | 2000   | 684     | 720    | 1700        | 1215      | 076.0123    | 800       | 076.1121    | 1404      | 076.3001    |
| 500     | 25       | 508.0   | 6.3     | 2500   | 890     | 814    | 2200        | 1256      | 076.0125    | 800       | 076.7677    | 1445      | 076.3000    |
| 600     | 25       | 610     | 7.1     | 3000   | 1087    | 955    | ca. 3000    | 1389      | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 700     | 25       | 711     | 8.0     | 3000   | 1040    | 1116   | ca. 4500    | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 800     | 25       | 813     | 8.8     | 3000   | 1232    | 1261   | ca. 5700    | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 900     | 25       | 914     | 10      | 3000   | o. d.   | 1396   | ca. 7400    | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 1000    | 25       | 1016    | 11      | 3000   | 1176    | 1561   | ca. 11000   | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 1200    | 25       | 1220    | 12.5    | o. d.  | o. d.   | 1890   | ca. 19000   | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |

\* The wall thickness adjustment of the pipe ends is carried out according to dimension s. For the actual pipe wall thicknesses used, please refer to the table on the „Technical Information“ supplement.

Ball valves from nominal size DN700 are made to order in accordance with the customer's requirements. Please refer to the corresponding drawings in case of order.

## BBF/KSF-R-HE

### UNDERGROUND BALL VALVE WITH WELD ENDS

DN 40-150 | PN 25

REDUCED BORE



### INFORMATION

#### Ball Valve with weld ends

/// Ball Valves fulfill the requirements of EN 488 and are suitable for the cold laying method

/// Operating temperature up to +150 °C

/// The square key is included in the scope of delivery.

/// Underground ball valves are delivered unpainted.

#### From DN 150:

/// Trunnion mounted ball is standard

### MATERIALS

**Body** Forged Steel / Steel

**Weld Ends** Steel

**Ball** Stainless steel

**Ball Seals** PTFE

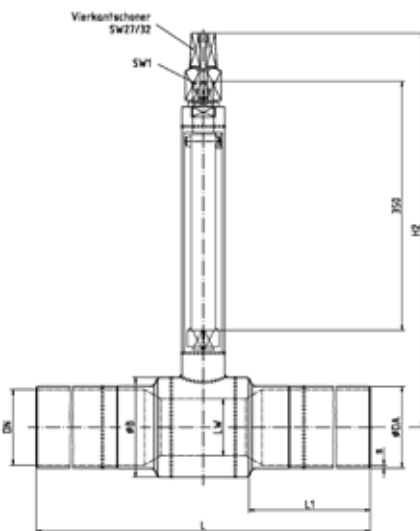
**Stem Seals** EPDM

### OPTIONS

/// Suitable for steam

/// Additional extensions for adjusting the overlap height and other accessories can be found on the supplementary sheet: „Accessories for buried ball valves“.

/// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.



| DN/LW [mm] | PN [bar] | DA [mm] | s* [mm] | L [mm] | L1 [mm] | B [mm] | H2 [mm] | SW 1 [mm] | Weight [kg] | Article-No. |
|------------|----------|---------|---------|--------|---------|--------|---------|-----------|-------------|-------------|
| 40/32      | 25       | 48.3    | 2.6     | 1500   | 712     | 64     | 488     | 16        | 11.0        | 076.0112    |
| 50/40      | 25       | 60.3    | 2.9     | 1500   | 710     | 76     | 493     | 16        | 12.5        | 076.0045    |
| 65/50      | 25       | 76.1    | 2.9     | 1500   | 705     | 89     | 501     | 16        | 17.0        | 076.0047    |
| 80/65      | 25       | 88.9    | 3.2     | 1500   | 694     | 121    | 515     | 16        | 22.0        | 076.0049    |
| 100/80     | 25       | 114.3   | 3.6     | 1500   | 688     | 140    | 549     | 22        | 30.0        | 076.0080    |
| 125/100    | 25       | 139.7   | 3.6     | 1500   | 680     | 171    | 562     | 22        | 39.5        | 076.0097    |
| 150/125    | 25       | 168.3   | 4.0     | 1500   | 667     | 203    | 581     | 22        | 51.3        | 076.0104    |

\* The wall thickness adjustment of the pipe ends is carried out according to dimension s. For the actual pipe wall thicknesses used, please refer to the table on the „Technical Information“ supplement.



# BBF/KSF-R-HE

## UNDERGROUND BALL VALVE WITH WELD ENDS

**DN 200-400 | PN 25**

**REDUCED BORE**

### INFORMATION

**Ball Valve with weld ends**

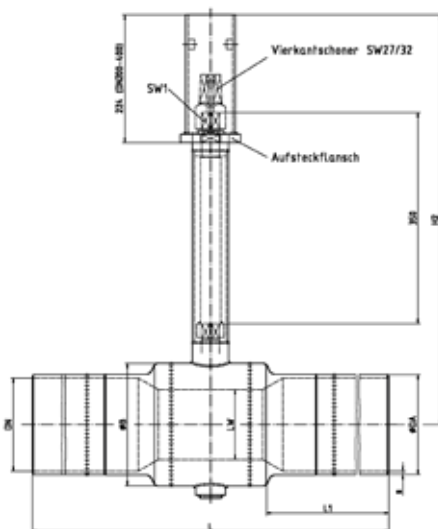
- /// Ball Valves fulfill the requirements of EN 488 and are suitable for the cold laying method
- /// Operating temperature up to +150 °C
- /// Trunnion mounted ball is standard
- /// Underground ball valves are delivered unpainted.
- /// The recommended actuation is via a plug-in gear from DN 200. The required slip-on flange with square protector is included in the scope of delivery.
- /// Further information on plug-in gearboxes can be found on the supplementary sheet „Accessories for buried ball valves“.

### MATERIALS

|                   |                      |
|-------------------|----------------------|
| <b>Body</b>       | Forged Steel / Steel |
| <b>Weld Ends</b>  | Steel                |
| <b>Ball</b>       | Stainless steel      |
| <b>Ball Seals</b> | PTFE                 |
| <b>Stem Seals</b> | EPDM                 |

### OPTIONS

- /// Suitable for steam
- /// Additional extensions for adjusting the overlap height and other accessories can be found on the supplementary sheet: „Accessories for buried ball valves“.
- /// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.



| DN/LW [mm] | PN [bar] | DA [mm] | s* [mm] | L [mm] | L1 [mm] | B [mm] | H2 [mm] | SW 1 [mm] | Weight [kg] | Article-No. |
|------------|----------|---------|---------|--------|---------|--------|---------|-----------|-------------|-------------|
| 200/150    | 25       | 219.1   | 4.5     | 1500   | 648     | 254    | 725     | 32        | 100         | 076.0106    |
| 250/200    | 25       | 273.0   | 5.0     | 1500   | 625     | 324    | 760     | 32        | 140         | 076.0114    |
| 300/250    | 25       | 323.9   | 5.6     | 2000   | 817     | 407    | 900     | 32        | 380         | 076.0116    |
| 350/300    | 25       | 355.6   | 5.6     | 2000   | 769     | 508    | 942     | 32        | 645         | 076.0118    |
| 400/300    | 25       | 404.6   | 6.3     | 2000   | 770     | 508    | 942     | 32        | 680         | 076.0154    |

\* The wall thickness adjustment of the pipe ends is carried out according to dimension s. For the actual pipe wall thicknesses used, please refer to the table on the „Technical Information“ supplement.

# BBF/KSF-R-HE

## UNDERGROUND BALL VALVE WITH WELD ENDS

**DN 450-1200 | PN 25**

**REDUCED BORE**



### INFORMATION

**Ball Valve with weld ends**

/// Ball Valves fulfill the requirements of EN 488 and are suitable for the cold laying method

/// Operating temperature up to +150 °C

/// Trunnion mounted ball is standard

/// Underground ball valves are delivered unpainted.

**From DN 350:**

/// The gear unit and the square key are included in the scope of delivery.

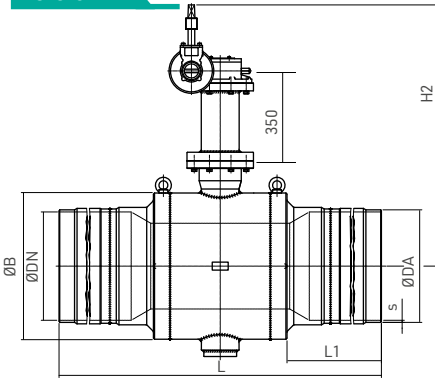
### MATERIALS

|                   |   |
|-------------------|---|
| <b>Body</b>       | Forged Steel / Steel  |
| <b>Weld Ends</b>  | Steel   |
| <b>Ball</b>       | Stainless steel;<br>From DN 600: Steel<br>chemically nickel<br>plated |
| <b>Ball Seals</b> | PTFE  |
| <b>Stem Seals</b> | EPDM  |

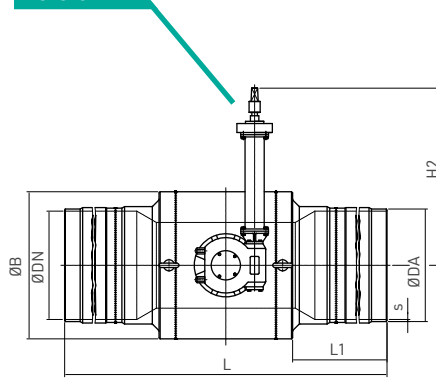
### OPTIONS

- /// Suitable for steam
- /// Additional extensions for adjusting the overlap height (for version 2 and 3) and other accessories can be found on the supplementary sheet: „Accessories for buried ball valves“.
- /// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.

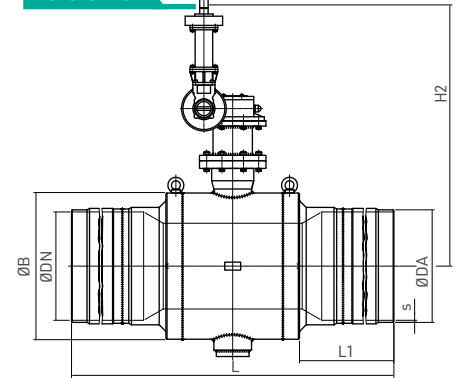
**Version 1**



**Version 2**



**Version 3**



| DN [mm] | PN [bar] | DA [mm] | s* [mm] | L [mm] | L1 [mm] | B [mm] | Weight [kg] | Version 1 |             | Version 2 |             | Version 3 |             |
|---------|----------|---------|---------|--------|---------|--------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
|         |          |         |         |        |         |        |             | H2 [mm]   | Article-No. | H2 [mm]   | Article-No. | H2 [mm]   | Article-No. |
| 450     | 25       | 457     | 6.3     | 2000   | 819     | 720    | 1120        | 1121      | 076.0124    | 800       | o. d.       | 1368      | o. d.       |
| 500     | 25       | 508.0   | 6.3     | 2500   | 819     | 814    | 1400        | 1121      | 076.0126    | 800       | o. d.       | 1368      | o. d.       |
| 600     | 25       | 610     | 7.1     | 1143   | 1140    | 955    | 2400        | 1256      | o. d.       | 800       | o. d.       | 1445      | o. d.       |
| 700     | 25       | 711     | 8.0     | 1295   | 1087    | 1116   | ca. 3200    | 1389      | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 800     | 25       | 813     | 8.8     | 1397   | 1040    | 1261   | ca. 4700    | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 900     | 25       | 914     | 10      | 1499   | 1232    | 1396   | ca. 6000    | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 1000    | 25       | 1016    | 11      | 1800   | a.A.    | 1561   | ca. 7700    | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |
| 1200    | 25       | 1220    | 12.5    | 2400   | a.A.    | 1890   | ca. 12000   | o. d.     | o. d.       | o. d.     | o. d.       | o. d.     | o. d.       |

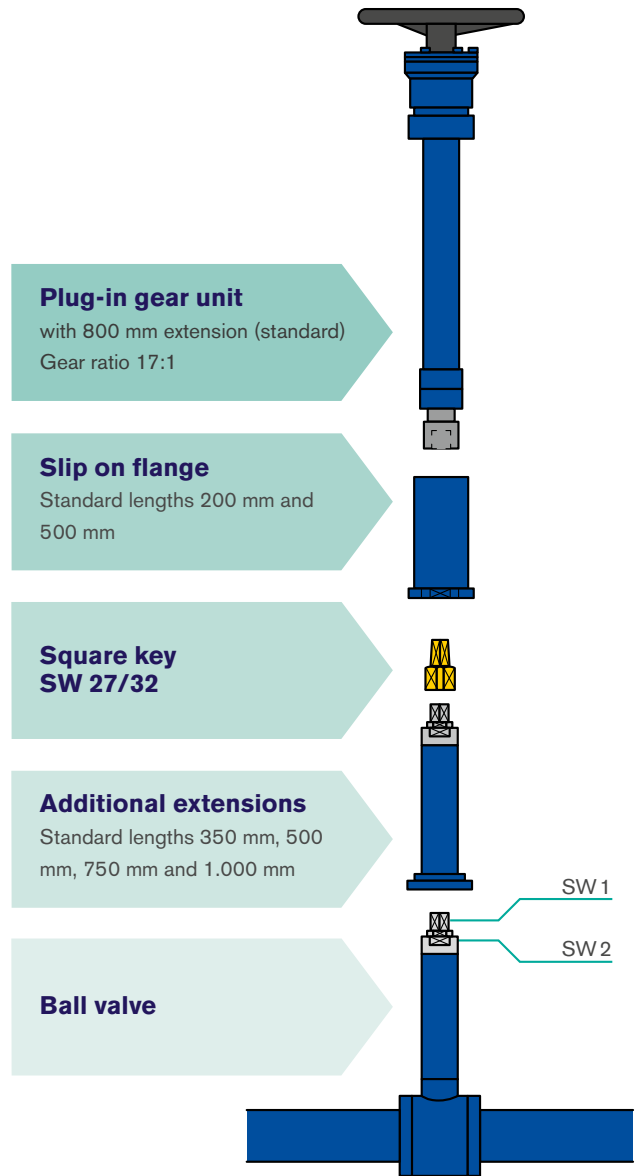
\* The wall thickness adjustment of the pipe ends is carried out according to dimension s. For the actual pipe wall thicknesses used, please refer to the table on the „Technical Information“ supplement.

Ball valves from nominal size DN700 are made to order in accordance with the customer's requirements. Please refer to the corresponding drawings in case of order.

# ACTUATING ACCESSORIES FOR UNDERGROUND BALL VALVES

The accessories for the Böhmer inground ball valves are designed on a modular principle.

The components can only be mounted in one positioning. The two-flat is used to accommodate additional extensions and slip-on flanges and is always aligned parallel to the pipeline axis. In conjunction with the notch for the ball bore in the square cap, a clear position indicator is thus always visible at the head of the valve in Böhmer inground ball valves.



| DN        | DN               | SW 1 | SW 2 | Slip on flange<br>L 200 mm | Slip on flange<br>L 500 mm | Square key<br>yellow | Additional<br>extension<br>L 350 mm | Additional<br>extension<br>L 500 mm | Additional<br>extension<br>L 750 mm | Additional<br>extension<br>L 1000 mm | Plug-in gear<br>MDS 3000<br>L 800 mm | Socket<br>wrench    |
|-----------|------------------|------|------|----------------------------|----------------------------|----------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------------|
| full bore | reduced<br>boire | mm   | mm   | Article-No./<br>kg         | Article-No./<br>/kg        | Article-No./<br>/kg  | Article-No./<br>/kg                 | Article-No./<br>/kg                 | Article-No./<br>/kg                 | Article-No./<br>/kg                  | Article-No./<br>/kg                  | Article-No./<br>/kg |
| 20 – 65   | 25 – 80          | 16   | 40   | 075.7200<br>1,9            | 075.7201<br>4,8            | 628.2496<br>0,5      | 076.0736<br>2,5                     | 076.0737<br>3,3                     | 076.0729<br>4,7                     | 076.0947<br>6,2                      |                                      |                     |
| 80 – 125  | 100 – 150        | 22   | 50   | 075.7202<br>2,3            | 075.7203<br>4,9            | 628.2497<br>0,8      | 076.0682<br>4,5                     | 076.0738<br>5,4                     | 076.0739<br>7,5                     | 076.0805<br>9,1                      | 075.9999<br>18,4                     | 316.9999<br>6,0     |
| 150 – 300 | 200 – 400        | 32   | 80   | 075.7204<br>3,1            | 075.7205<br>5,6            | 628.2498<br>1,4      | 076.0623<br>10,5                    | 076.0740<br>12,5                    | 076.0640<br>17,5                    | 076.0720<br>22,0                     |                                      |                     |

# OPTIONS

|  | Underground Ball valves HE |           |           |                                     |                                   | Standard Ball valves HS |                |       |  |           |       |                                   |
|--|----------------------------|-----------|-----------|-------------------------------------|-----------------------------------|-------------------------|----------------|-------|--|-----------|-------|-----------------------------------|
|  | KSF V<br>KSF R             | ELF/ESF V | EMG/ESF V | KSF V<br>KSF R<br>Tie-in ball valve | KSF V<br>(Hot tapping ball valve) | KSF V<br>KSF R          | FSK V<br>FSK R | FSL V | FSL/KSF V + FSK/KSF V<br>FSL/KSF R + FSK/KSF R | KSG/KSF V | KSG V | KSF V<br>(Hot tapping ball valve) |
| Variable lengths for underground installation <sup>1</sup>               | ✓                          |           |           |                                     |                                   |                         |                |       |  |           |       |                                   |
| Special lengths  |                            | ✓         | ✓         |                                     |                                   | ✓                       |                | ✓     | ✓  | ✓         |       |                                   |
| Variable stem extensions for underground installation <sup>2</sup>       | ✓                          |           |           |                                     |                                   |                         |                |       |  |           |       |                                   |
| Stem extension 60 mm /100 mm   |                            |           |           |                                     |                                   | ✓                       | ✓              | ✓     | ✓  | ✓         | ✓     | ✓                                 |
| Spigot for drain and vent ball valve                                     | ✓                          |           |           |                                     |                                   |                         |                |       |  |           |       |                                   |
| Test connection from DN150<br>(with plug or ball valve)                  |                            |           |           |                                     |                                   | ✓                       | ✓              | ✓     |  |           |       |                                   |
| greater wall thicknesses for extreme axial loads or corrosion surcharges | ✓                          |           |           |                                     |                                   |                         |                |       |  |           |       |                                   |
| With Flange/Weld end from DN125  |                            |           |           |                                     | ✓                                 |                         |                |       |  |           |       |                                   |
| Suitable for steam   | ✓                          |           |           | ✓                                   | ✓                                 | ✓                       | ✓              | ✓     |  |           | ✓     |                                   |

<sup>1</sup>Variable overall lengths for installation in the ground:

The overall lengths specified in the catalog correspond to the standard dimensions. Other overall lengths are available on request as special production.

<sup>2</sup>Variable spindle extensions for buried installation:

The dome height of 350 mm shown in the catalog corresponds to the standard. In addition, dome heights of 500 mm, 750 mm and 1000 mm can be manufactured on request.

Tender specification texts are available for download on our website.



# TENSILE AND COMPRESSIVE FORCES, DRAG COEFFICIENTS

## Permissible tensile and compressive forces

| Diameter of the connecting pipe |                         | Examples of pre-heated pipes and "cold-laid" pipes |   |
|---------------------------------|-------------------------|--|---|
| Full bore DN [mm]               | reduced bore DN/LW [mm] | Tensile force at 130 K cooling [kN]                | Compressive force at 130 K heating [kN] |
| 20                              | 20/16                   | 26   | 41                                      |
| 25                              | 25/50                   | 37   | 60                                      |
| 32                              | 32/25                   | 53   | 86                                      |
| 40                              | 40/32                   | 61   | 99                                      |
| 50                              | 50/40                   | 85   | 139                                     |
| 65                              | 65/50                   | 109  | 177                                     |
| 80                              | 80/65                   | 140  | 228                                     |
| 100                             | 100/80                  | 204  | 332                                     |
| 125                             | 125/100                 | 251  | 480                                     |
| 150                             | 150/125                 | 337  | 547                                     |
| 200                             | 200/150                 | 495  | 804                                     |
| 250                             | 250/200                 | 686  | 1.116                                   |
| 300                             | 300/250                 | 913  | 1.484                                   |
| 350                             | 350/300                 | 1.004  | 1.632                                   |
| 400                             | 400/300                 | 1.291  | 2.098                                   |
| 450                             | 450/400                 | 1.454  | 2.364                                   |
| 500                             | 500/400                 | 1.619  | 2.423                                   |
| 600                             | 600/500                 | 2.192  | 3.087                                   |
| 700                             | 700/600                 | 2.880  | 3.926                                   |
| 800                             | 800/700                 | 3.624  | 4.761                                   |
| 900                             | 900/800                 | 4.629  | 6.144                                   |
| 1000                            | 1000/900                | 5.661  | 7.439                                   |
| 1200                            | 1200/1000               | 7.729  | 9.636                                   |

The permissible tensile and compressive forces in the adjacent table correspond to the figures required by EN 488. The permissible tensile and compression forces listed here are valid for all fully-welded BÖHMER district heating ball valves.

**Ball valves for greater forces are also available on written request.**

## Drag coefficients

| Full Bore |                                    |      | Reduced Bore |                                    |      |
|-----------|------------------------------------|------|--------------|------------------------------------|------|
| DN        | K <sub>v</sub> [m <sup>3</sup> /h] | ζ(-) | DN/LW        | K <sub>v</sub> [m <sup>3</sup> /h] | ζ(-) |
| 10-16     | 25                                 | 0.17 | 20/16        | 15                                 | 1.14 |
| 20        | 52                                 | 0.09 | 20/16        | 15                                 | 1.14 |
| 25        | 83                                 | 0.09 | 25/20        | 32                                 | 0.60 |
| 32        | 119                                | 0.12 | 32/25        | 50                                 | 0.67 |
| 40        | 203                                | 0.10 | 40/32        | 98                                 | 0.43 |
| 50        | 334                                | 0.09 | 50/40        | 139                                | 0.51 |
| 65        | 603                                | 0.08 | 65/60        | 242                                | 0.49 |
| 80        | 978                                | 0.07 | 80/65        | 359                                | 0.51 |
| 100       | 1.510                              | 0.06 | 100/80       | 604                                | 0.44 |
| 125       | 2.558                              | 0.06 | 125/100      | 932                                | 0.45 |
| 150       | 4.181                              | 0.05 | 150/125      | 1.411                              | 0.41 |
| 200       | 7.983                              | 0.05 | 200/150      | 2.547                              | 0.40 |
| 250       | 13.580                             | 0.04 | 250/200      | 4.228                              | 0.35 |
| 300       | 20.917                             | 0.03 | 300/250      | 6.189                              | 0.34 |
| 350       | 28.897                             | 0.03 | 350/300      | -                                  | -    |
| 400       | 38.319                             | 0.03 | 400/300      | 10.963                             | 0.34 |
| 450       | 43.914                             | 0.03 | 450/400      | -                                  | -    |
| 500       | 60.542                             | 0.03 | 500/400      | 17.981                             | 0.31 |
| 600       | 93.059                             | 0.02 | 600/500      | 26.771                             | 0.29 |
| 700       | 129.351                            | 0.02 | 700/600      | 38.483                             | 0.26 |
| 800       | 196.170                            | 0.02 | 800/700      | 45.020                             | 0.25 |
| 900       | 223.513                            | 0.02 | 900/800      | 60.739                             | 0.22 |
| 1000      | 283.612                            | 0.02 | 1000/900     | 80.175                             | 0.20 |
| 1200      | 439.598                            | 0.01 | 1200/1000    | 82.375                             | 0.22 |

The drag coefficients were determined for ball valves with solid balls.

Hollow balls cause more resistance and thus result in higher drag coefficients. In order to determine the exact losses, it is necessary to distinguish between trunnion-mounted and floating hollow balls.

Since the use of trunnion-mounted balls depends partly on the operating pressure, it is not possible to determine generally-valid drag coefficients for hollow balls as a function of nominal sizes.

The following are drag coefficients of butterfly valves based on approximate figures according to Dubbel:

|         |        |                        |
|---------|--------|------------------------|
| DN 50:  | ζ=1.4  | K <sub>v</sub> =85     |
| DN 200: | ζ=0.8  | K <sub>v</sub> =1.790  |
| DN 500: | ζ=0.63 | K <sub>v</sub> =12.613 |

# TECHNICAL INFORMATION

## Wall thicknesses for ball valves for underground installation

The pipe ends used for BÖHMER inground district heating ball valves comply with the requirements of AD-Merkblatt B9 for the necking of pipes. Necking for drain and vent lines can be carried out on these pipes without falling below the minimum

wall thickness requirements of EN488. The following wall thicknesses refer to the pipe material used. These are machined at the weld preparation by wall thickness adjustment.

| DN              | 20          | 25          | 32          | 40          | 50          |
|-----------------|-------------|-------------|-------------|-------------|-------------|
| Pipe dimensions | 26,9 x 3,2  | 33,7 x 3,2  | 42,4 x 3,2  | 48,3 x 3,6  | 60,3 x 3,6  |
| DN              | 65          | 80          | 100         | 125         | 150         |
| Pipe dimensions | 76,1 x 4,0  | 88,9 x 4,5  | 114,3 x 4,5 | 139,7 x 4,5 | 168,3 x 5,0 |
| DN              | 200         | 250         | 300         | 350         | 400         |
| Pipe dimensions | 219,1 x 6,3 | 273,0 x 7,1 | 323,9 x 8,0 | 355,6 x 8,0 | 406,4 x 8,8 |

## Flange dimensions

For all ball valves the standard for flange connections EN1092 is complied with. Below you will find an overview of the flange connection dimensions for pressure ratings PN10 - PN40, which

were not listed in the data sheets for reasons of clarity. The flange sheet thicknesses may deviate upwards from the dimensions required in the standard for manufacturing reasons.

| DN  | PN10 | PN16 | PN25 | PN40 | D   | g   | K   | b  | z  | d  |
|-----|------|------|------|------|-----|-----|-----|----|----|----|
| 10  | X    | X    | X    | X    | 90  | 40  | 60  | 16 | 4  | 14 |
| 15  | X    | X    | X    | X    | 95  | 45  | 65  | 16 | 4  | 14 |
| 20  | X    | X    | X    | X    | 105 | 58  | 75  | 18 | 4  | 14 |
| 25  | X    | X    | X    | X    | 115 | 68  | 85  | 18 | 4  | 14 |
| 32  | X    | X    | X    | X    | 140 | 78  | 100 | 18 | 4  | 18 |
| 40  | X    | X    | X    | X    | 150 | 88  | 110 | 18 | 4  | 18 |
| 50  | X    | X    | X    | X    | 165 | 102 | 125 | 20 | 4  | 18 |
| 65  | X    | X    |      |      | 185 | 122 | 145 | 22 | 4  | 18 |
| 65  |      |      | X    | X    | 185 | 122 | 145 | 22 | 8  | 18 |
| 80  | X    | X    | X    | X    | 200 | 138 | 160 | 24 | 8  | 18 |
| 100 | X    | X    |      |      | 220 | 158 | 180 | 20 | 8  | 18 |
| 100 |      |      | X    | X    | 235 | 162 | 190 | 24 | 8  | 22 |
| 125 | X    | X    |      |      | 250 | 188 | 210 | 22 | 8  | 18 |
| 125 |      |      | X    | X    | 270 | 188 | 220 | 26 | 8  | 26 |
| 150 | X    | X    |      |      | 285 | 212 | 240 | 22 | 8  | 22 |
| 150 |      |      | X    | X    | 300 | 218 | 250 | 28 | 8  | 26 |
| 200 | X    |      |      |      | 340 | 268 | 295 | 24 | 8  | 22 |
| 200 |      | X    |      |      | 340 | 268 | 295 | 24 | 12 | 22 |
| 200 |      |      | X    |      | 360 | 278 | 310 | 30 | 12 | 26 |
| 200 |      |      |      | X    | 375 | 285 | 320 | 34 | 12 | 30 |
| 250 | X    |      |      |      | 395 | 320 | 350 | 26 | 12 | 22 |
| 250 |      | X    |      |      | 405 | 320 | 355 | 26 | 12 | 26 |
| 250 |      |      | X    |      | 425 | 335 | 370 | 32 | 12 | 30 |
| 250 |      |      |      | X    | 450 | 345 | 385 | 38 | 12 | 33 |
| 300 | X    |      |      |      | 445 | 370 | 400 | 26 | 12 | 22 |
| 300 |      | X    |      |      | 460 | 378 | 410 | 28 | 12 | 26 |
| 300 |      |      | X    |      | 485 | 395 | 430 | 34 | 16 | 30 |
| 300 |      |      |      | X    | 515 | 410 | 450 | 42 | 16 | 33 |
| 350 | X    |      |      |      | 505 | 430 | 460 | 26 | 16 | 22 |
| 350 |      | X    |      |      | 520 | 438 | 470 | 30 | 16 | 26 |
| 350 |      |      | X    |      | 555 | 450 | 490 | 38 | 16 | 33 |
| 350 |      |      |      | X    | 580 | 465 | 510 | 46 | 16 | 36 |
| 400 | X    |      |      |      | 565 | 482 | 515 | 26 | 16 | 26 |
| 400 |      | X    |      |      | 580 | 490 | 525 | 32 | 16 | 30 |
| 400 |      |      | X    |      | 620 | 505 | 550 | 40 | 16 | 36 |
| 400 |      |      |      | X    | 660 | 535 | 585 | 50 | 16 | 39 |