

BBF/FSK/KSF-V-HS FSL/KSF-V-HS

BALL VALVE FOR VENTING AND
DRAINING WITH FLANGE
AND WELDING END

DN 15-150 | PN 25

FULL BORE



INFORMATION

Ball valve for venting and draining with flange and welding end

/// Operating temperature up to +150 °C

/// From DN125 The trunnion mounted ball is standard

/// Flange drilled and dimensioned according to EN 1092 - pressure rating PN 25. Observe pressure-temperature rating. Flange dimensions can be found on the supplementary sheet „Technical Information“.

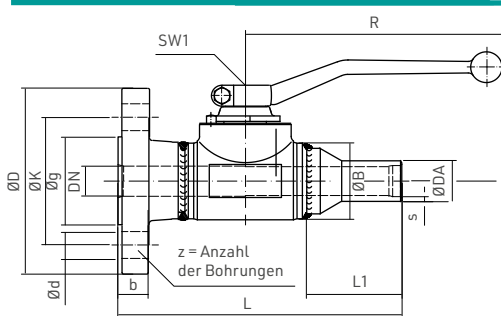
MATERIALS

| | |
|--------------------|----------------------|
| Body | Forged Steel / Steel |
| Flange | Steel |
| Welding End | Steel |
| Ball | Stainless Steel |
| Ball Seals | PTFE |
| Stem Seals | EPDM |

OPTIONS

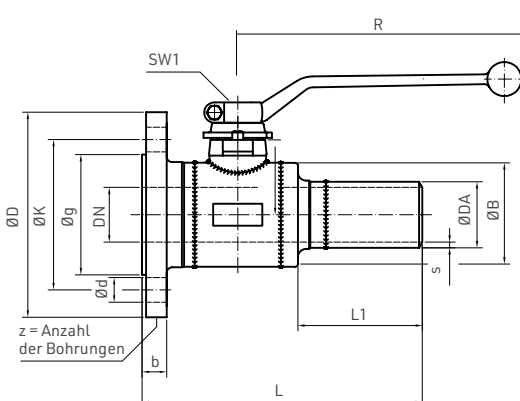
- /// Suitable for steam
- /// Further options for this ball valve according to the list on the „Options“ supplementary sheet
- /// For deviating operating conditions please send us a written request stating the fluids, as well as the pressure and temperature range.

Not suitable for autogenous welding



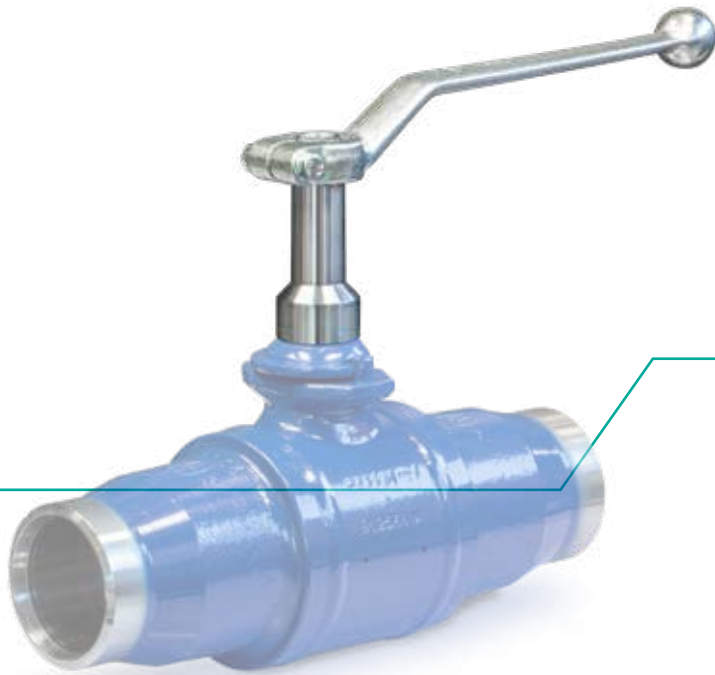
| DN [mm] | PN [bar] | Da [mm] | s [mm] | L [mm] | L1 [mm] | B [mm] | D [mm] | R [mm] | SW1 [mm] | Weight [kg] | Article-No. |
|---------|----------|---------|--------|--------|---------|--------|--------|--------|----------|-------------|-------------|
| 15 | 25 | 21.3 | 2.6 | 145 | 104 | 39 | 95 | 130 | 10 | 1.7 | 050.9125 |
| 20 | 25 | 26.9 | 3.2 | 155 | 103 | 44 | 105 | 130 | 10 | 2.3 | 050.9126 |
| 25 | 25 | 33.7 | 3.2 | 170 | 100 | 54 | 115 | 180 | 12 | 3.1 | 050.9127 |
| 32 | 25 | 42.4 | 3.2 | 165 | 94 | 64 | 140 | 205 | 16 | 4.2 | 050.9128 |
| 40 | 25 | 48.3 | 3.2 | 175 | 91 | 76 | 150 | 205 | 16 | 5.2 | 050.9129 |
| 50 | 25 | 60.3 | 3.6 | 200 | 78 | 89 | 165 | 205 | 16 | 7.8 | 050.0143 |
| 65 | 25 | 76.1 | 3.6 | 280 | 80 | 121 | 185 | 300 | 16 | 11.6 | 050.0773 |
| 80 | 25 | 88.9 | 4.0 | 295 | 78 | 140 | 200 | 350 | 22 | 14.2 | 050.0732 |
| 100 | 25 | 114.3 | 4.0 | 325 | 80 | 171 | 235 | 350 | 22 | 21.9 | 050.0743 |
| 125 | 25 | 139.7 | 4.5 | 338 | 90 | 203 | 270 | 500 | 22 | 33.0 | 050.0753 |
| 150 | 25 | 168.3 | 5.0 | 375 | 90 | 254 | 300 | 600 | 32 | 58.0 | 050.1501 |

Suitable for autogenous welding, Ensure sufficient cooling of the housing body.



| DN [mm] | PN [bar] | Da [mm] | s [mm] | L [mm] | L1 [mm] | B [mm] | D [mm] | R [mm] | SW1 [mm] | Weight [kg] | Article-No. |
|---------|----------|---------|--------|--------|---------|--------|--------|--------|----------|-------------|-------------|
| 15 | 25 | 21,3 | 2,6 | 200 | 104 | 39 | 95 | 130 | 10 | 1,7 | 050.0724 |
| 20 | 25 | 26,9 | 3,2 | 210 | 103 | 44 | 105 | 130 | 10 | 2,3 | 050.6489 |
| 25 | 25 | 33,7 | 3,2 | 215 | 100 | 54 | 115 | 180 | 12 | 3,1 | 050.9847 |
| 32 | 25 | 42,4 | 3,2 | 200 | 94 | 64 | 140 | 205 | 16 | 4,2 | 050.0141 |
| 40 | 25 | 48,3 | 3,2 | 205 | 91 | 76 | 150 | 205 | 16 | 5,2 | 050.0142 |

STEM EXTENSION



DN 15-200 FULL BORE /
DN 65-250 REDUCED BORE

INFORMATION

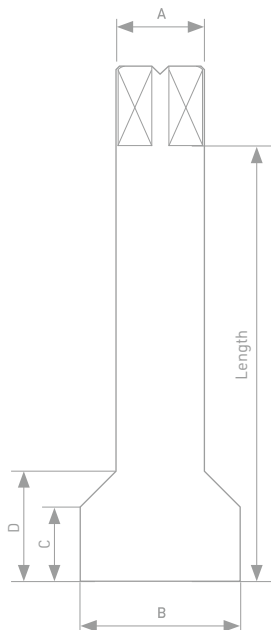
Stem extension for use on ball valves provided they are fitted with insulation.

/// Stem extension only applicable for Ball valves in Heating water version

/// The mounting screw is included in the scope of delivery

MATERIAL

| | |
|----------------|-------------------|
| Stem extension | Stainless Steel |
| Mounting Screw | Steel, galvanized |



| DN | | Article-No. | | A [mm] | B [mm] | C [mm] | D [mm] |
|----------------|-------------------|----------------|-----------------|--------|--------|--------|--------|
| full bore [mm] | reduced bore [mm] | Length 60 [mm] | Length 100 [mm] | | | | |
| 15-20 | 15-25 | 050.3200 | 050.3204 | 12 | 22 | 11 | 16 |
| 25 | 32 | 050.3201 | 050.3205 | 15 | 22 | 12 | 16 |
| 32-65 | 40-80 | 050.3202 | 050.3206 | 20 | 31 | 15 | 21 |
| 80-125 | 100-150 | 050.3203 | 050.3207 | 28 | 45 | 24 | 33 |
| 150-200 | 200-250 | --- | 050.3208 | 40 | 55 | 29 | 37 |

OPTIONS

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

²Variable spindle extensions for buried installation:

We recommend using additional extensions from our accessories list on to compensate for height differences.

Tender specification texts are available for download on our website.

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 mi-

nimum 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 |

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 _v [m ³ /h] | ζ(-) | DN/LW | K _v [m ³ /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 Kv=85
 DN 200: ζ=0.8 Kv=1.790
 DN 500: ζ=0.63 Kv=12.613