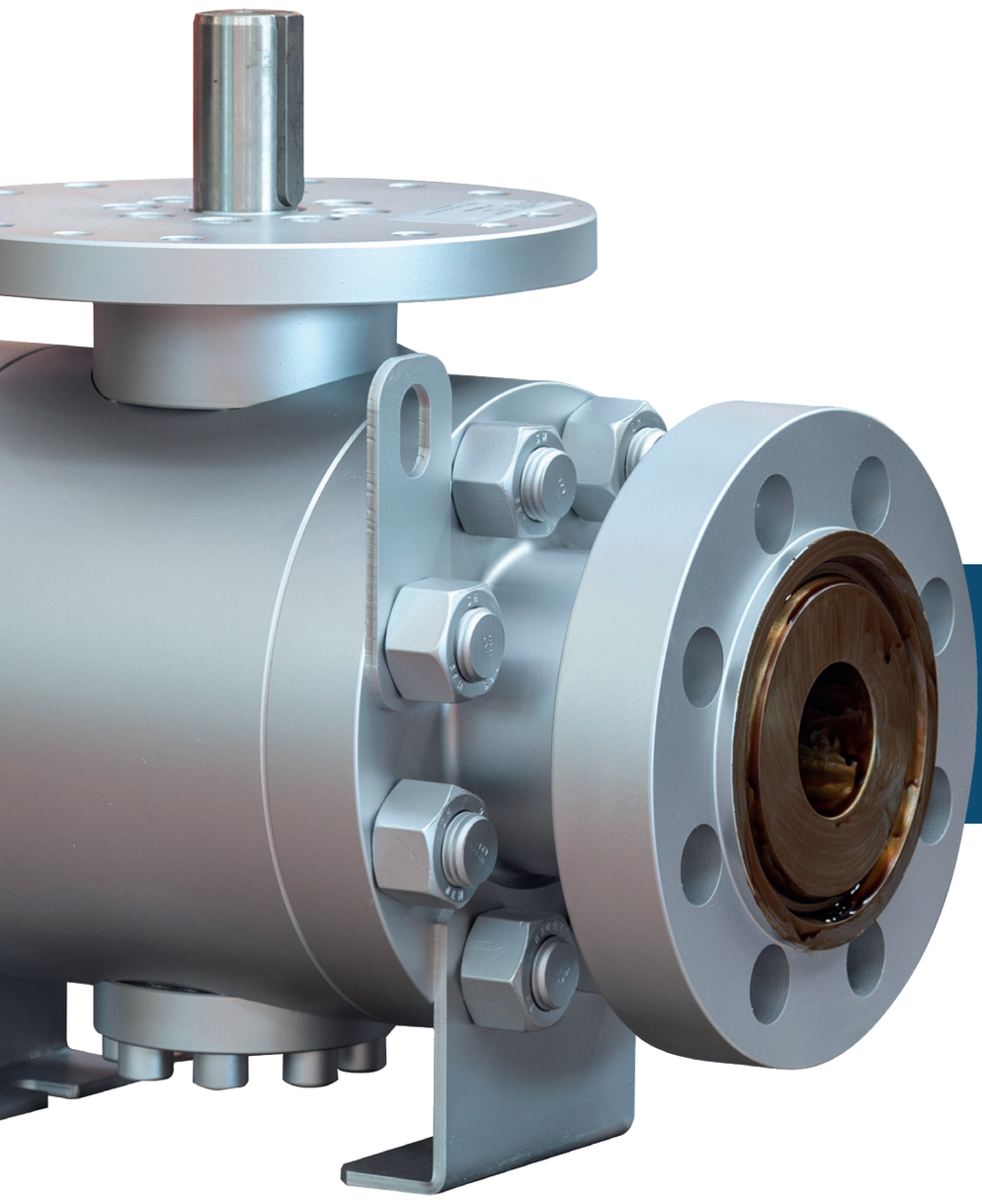
KURVALF

INDUSTRIAL VALVES AND AUTOMATION



# HIGH PERFORMANCE BALL VALVES

# HIGH PERFORMANCE BALL VALVES

Metal seated ball valves are preferred in severe service conditions like abrasive, corrosive fluid applications in high temperatures and pressures. In several industries, fluids could be a mixture of different ingredients like abrasive or corrosive media. Appropriately selected seat and ball surfaces show great resistance against severe service conditions.

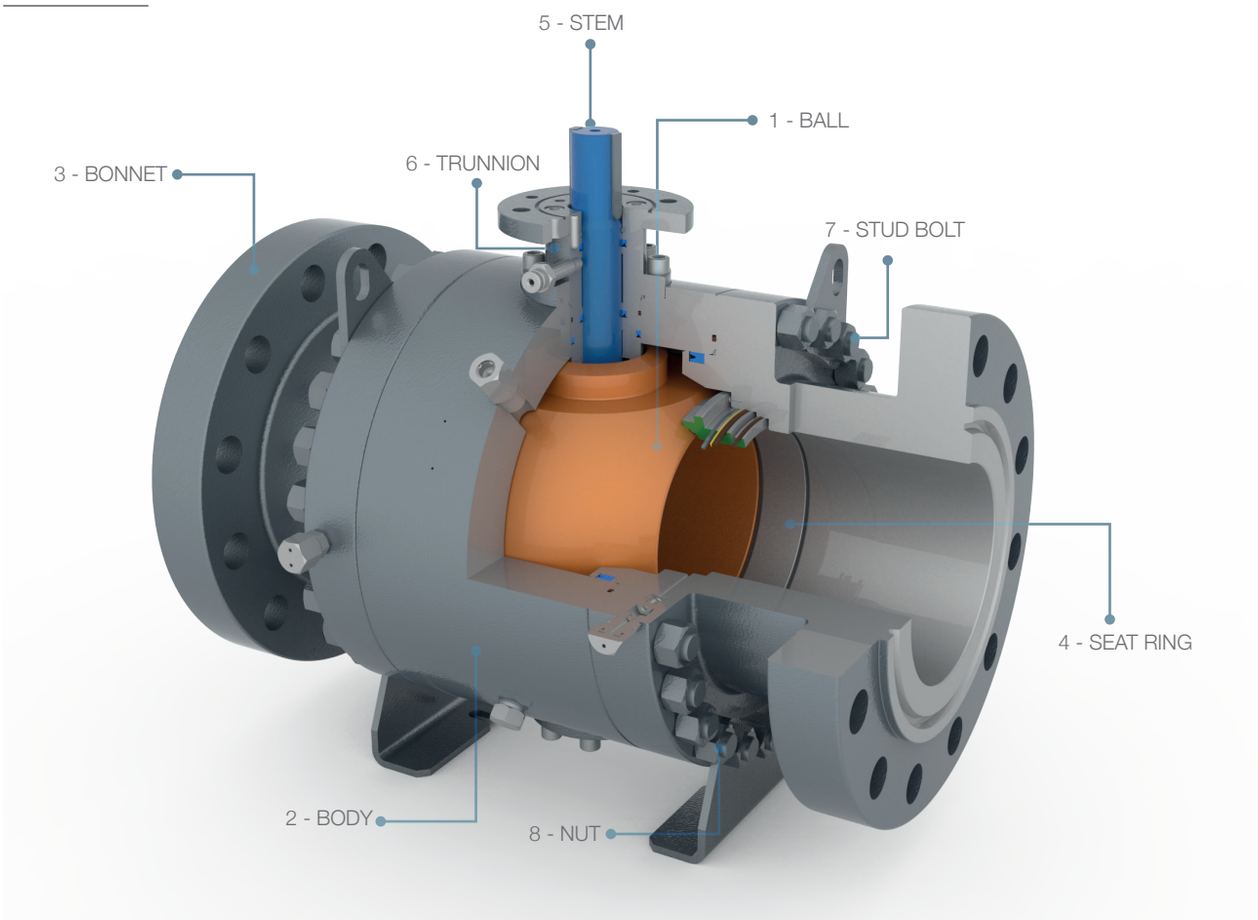
## WHERE TO USE

- Power Generation
- Chemical
- Petrochemical
- Oil & Gas
- Mining
- Refining
- Pulp & Paper
- Other Industries

| SPECIFICATIONS | |
|---|---|
| Valve Size | 2" - 24" |
| Valve Type | Trunnion |
| Body Type | Bolted |
| Pressure Class | ANSI 150 / 300 / 600 / 900 / 1500 / 2500 |
| End Connection | RF / RTJ / BW / NPT Threaded |
| Bore | Full Bore / Reduced Bore |
| Operator | Lever / Gear / Actuator |
| Material | Carbon Steel / Stainless Steel / Duplex / Alloy Steel / Titanium |
| Operating Temperature | Low / Standard / High |
| Isolation Type | DBB / DIB-1 / DIB-2 |

| REFERENCE STANDARDS | |
|---|---|
| Leakage Class | API 598 / ANSI FC70-2 / ISO 5208 |
| Design Standard | ASME B16.34 / API 6D / ISO 14313 / ISO 17292 |
| Face to Face Standard | ASME B16.10 |
| End Connection Standard | ASME B16.5 / ASME B16.25 / DIN EN 1092-1 |
| Test Standard | API 6D / API 598 / ISO 14313 |
| Fire Safe Standard | API 607 / ISO 10497 / API 6FA |
| Certification | EN 10204 3.1 - 3.2 / ISO 15848 Fugitive Emission / 2014-68-EU PED / SIL Capable / IP 67 (Gearbox) |

## MATERIALS



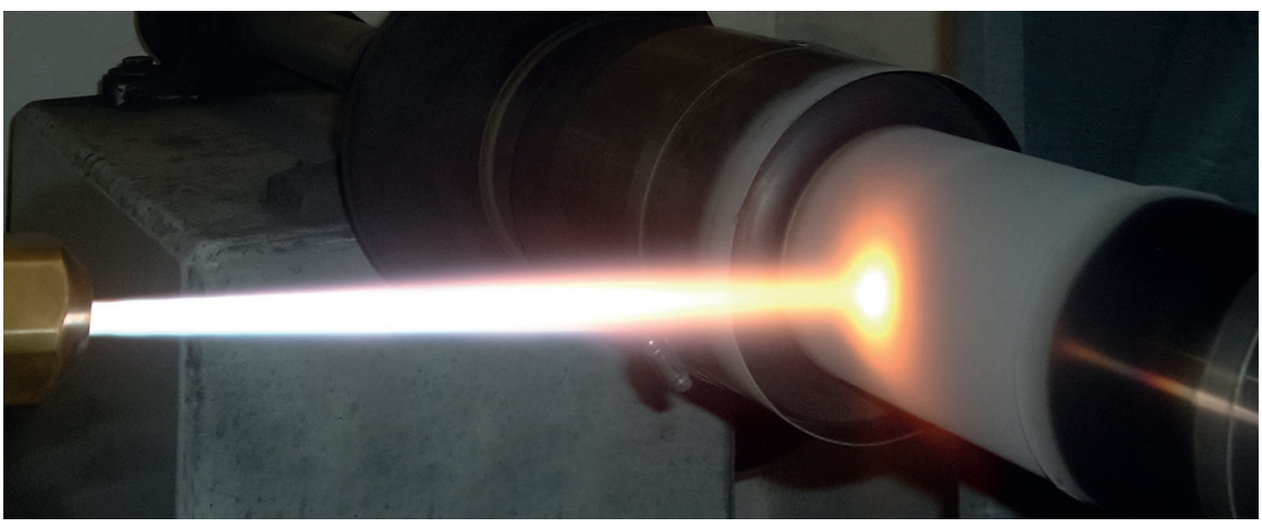

Material selection for valves operating under severe service conditions is very important for many reasons. When choosing the material, the operating tempeture and pressure of the process, the chemical and mechanical abrasiveness of the fluid should be taken into account.

Since the structural values of standard carbon steel materials begin to change at temperatures above approximately 250 °C, stainless steels are mostly preferred.

| | PART | STANDARD MATERIALS | OPTIONAL MATERIALS |
|---|---|---|---|
| 1 | BALL | Carbon Steel | Stainless Steel / Titanium / Duplex / Super Duplex / Special Alloy Steel |
| 2 | BODY | Carbon Steel | Stainless Steel / Titanium / Duplex / Super Duplex / Special Alloy Steel |
| 3 | BONNET | Carbon Steel | Stainless Steel / Titanium / Duplex / Super Duplex / Special Alloy Steel |
| 4 | SEAT RING | Carbon Steel | Stainless Steel / Titanium / Duplex / Super Duplex / Special Alloy Steel |
| 5 | STEM | Carbon Steel | Stainless Steel / Titanium / Duplex / Super Duplex / Special Alloy Steel |
| 6 | TRUNNION | Carbon Steel | Stainless Steel / Titanium / Duplex / Super Duplex / Special Alloy Steel |
| 7 | STUD BOLT | A193 Gr B7 | A193 L7, B6, B8, B16, B17B / A913 Inconel 718 |
| 8 | NUT | A194 Gr 2H | A194 Gr 8A, 7 |

# HIGH PERFORMANCE BALL VALVES

## METAL COATING



It is inevitable to use metal seated design instead of soft seated design in processes with chemical corrosiveness and sliding wear. Ball and seat coating selection is highly important in valves with metal seats in order for the mechanical sealing design to work.

Tungsten carbide coating is commonly preferred in metal seated designs. Tungsten carbide coating has an extremely hard surface. Therefore, it is very resistant to physical abrasion. It maintains its functionality up to 550 °C, depending on other details of the process.

Chromium carbide coating is a type of coating used in conditions where tungsten carbide coating loses its functionality. It has excellent chemical corrosion and sliding wear resistance at temperatures even higher than 500 °C. Impact and fatigue resistance are good while thermal shock resistance is excellent.

## SEALING COMPONENTS

Sealing components are the most important components of valves. Sealing components directly affect the performance of the valve. The process should be analyzed very well in the selection of these metarials.

Seals are heavily affected by temperature and the chemical corrosiveness of the fluid. Elastomer materials such as o-rings or lipseals used in backseats in high performance valves maintain their functioning up to 230 °C. At the values higher than this temparature, graphite seals are used.

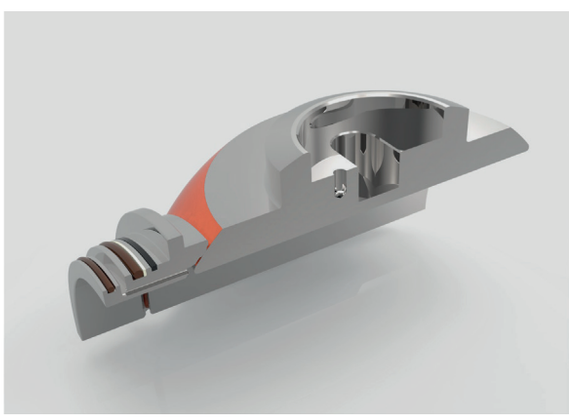
## TESTING

Leakage tests are very important in metal seated ball valves. Many valve test standards describe the test procedures in detail for valves with metal seats.

Although high sealing performance is not expected from metal seated valves as much as soft seated valves, we as KURVALF produce ball valves with very high sealing performance.

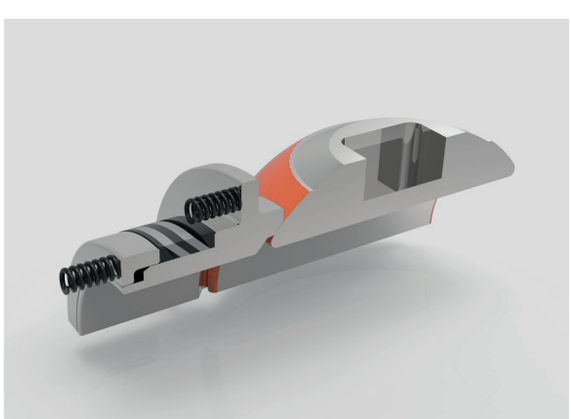
## DESIGN

Metal seated ball valves are used in many industries with many different fluids. The most essential information in the design phase of the valves is the process requirements of the industries. We as KURVALF make various metal seated valve designs and offer solutions suitable for different operating conditions. Stainless steels are mostly preferred.



### HIGH PERFORMANCE DESIGN

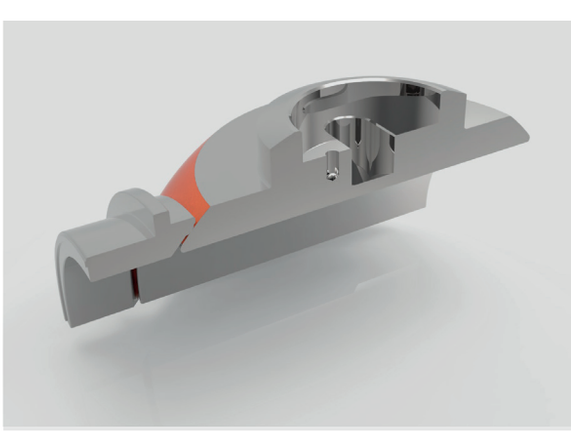
Elastomer material backseat seals are used in this design such as o-rings and lipseals. These seals maintain their functioning up to 230 °C.



### EXTREME PERFORMANCE DESIGN

Graphite material backseat seals are used in this design. These seals have better resistance than elastomer materials against temperature. However, the design selection depends on chemical and mechanical abrasiveness of the fluid.

This design is mostly used in applications at temperatures higher than 250 °C.



### FULL METAL DESIGN

The sealing which cannot be achieved with elastomer and graphite materials can be achieved in this metal to metal design.

# HIGH PERFORMANCE BALL VALVES

## DESIGN CONFIGURATION

| ASMEB16.34-2017<br>TABLE 2-1.1 RATINGS FOR GROUP 1.1 MATERIALS | | | | | | | |
|---|---|---|---|---|---|---|---|
| A105(1),(2) | | A350 GR. LF3 (6) | | A516 GR. 70 (1),(4) | | A672 GR. B70 (1) | |
| A102 GR.WCB (1) | | A350 GR. LF6 Cl.1 (5) | | A537 CL.1 (3) | | A672 GR. C70 (1) | |
| A350 GR LF2 (1) | | A515 GR. 70 (1) | | A696 GR . C (3) | | | |
| Temparature, °C | 150 | 300 | 600 | 900 | 1500 | 2500 | 4500 |
| -29 to 38 | 19.6 | 51.1 | 102.1 | 153.2 | 255.3 | 425-5 | 765.9 |
| 50 | 19.2 | 50.1 | 102.2 | 150.4 | 250.6 | 417.7 | 751.9 |
| 100 | 17.7 | 46.6 | 93.2 | 139.8 | 233.0 | 388.3 | 699.0 |
| 150 | 15.8 | 45.1 | 90.2 | 135.2 | 225.4 | 375.6 | 676.1 |
| 200 | 13.8 | 43.8 | 87.6 | 131.4 | 219.0 | 365.0 | 657.0 |
| 250 | 12.1 | 41.9 | 83.9 | 125.8 | 209.7 | 349.5 | 629.1 |
| 300 | 10.2 | 39.8 | 79.6 | 119.5 | 199.1 | 331.8 | 597.3 |
| 325 | 9.3 | 38.7 | 77.4 | 116.1 | 193.6 | 322.6 | 580.7 |
| 350 | 8.4 | 37.6 | 75.1 | 112.7 | 187.8 | 313.0 | 563.5 |
| 375 | 7.4 | 36.4 | 72.7 | 109.1 | 181.8 | 303.1 | 545.5 |
| 400 | 6.5 | 34.7 | 69.4 | 104.2 | 173.6 | 289.3 | 520.8 |
| 425 | 5.5 | 28.8 | 57.5 | 86.3 | 143.8 | 239.7 | 431.5 |
| 450 | 4.6 | 23.0 | 57.5 | 69.0 | 115.0 | 191.7 | 345.1 |
| 475 | 4.6 | 23.0 | 46.0 | 69.0 | 115.0 | 191.7 | 345.1 |
| 500 | 2.8 | 11.8 | 23.5 | 35.3 | 58.8 | 97.9 | 176.3 |

Notes
(1) Upon prolonged exposure to temperastures above 425°C, the carbide phase of steel may be converted to graphite. Permissible, but not recommended
for prolonged usage above 425°C.
(2) Only killed steel shall be used above 455°C
(3) Not to be used over 370°C
(4) Not to be used over 455°C
(5) Not to be used over 260°C
(6) Not to be used over 345°C

## DESIGN CONFIGURATION

| ASME B16.34-2017<br>TABLE 2-2.1 RATINGS FOR GROUP 2.1 MATERIALS | | | | | | | |
|---|---|---|---|---|---|---|---|
| A182 GR.F304 (1) | | A312GR. TP304 (1) | | A315 GR. CF8 (1) | | A430 GR. FP304 (1) | |
| A182 GR. F304H | | A312 GR. TP304H | | A358 GR. 304(1) | | A430 GR. FP304H | |
| A240 GR. 304(1) | | A351GR.CF10 | | A376 GR. TP304(1) | | A479 GR. 304(1) | |
| A240 GR. 304H | | A351GR.CF3 (2) | | A376 GR. TP304H | | A479 GR. 304H | |
| Temparature, °C | 150 | 300 | 600 | 900 | 1500 | 2500 | 4500 |
| -29 to 38 | 19.0 | 49.6 | 99.3 | 148.9 | 248.2 | 413.7 | 744.6 |
| 50 | 18.3 | 47.8 | 95.6 | 143.5 | 239.1 | 398.5 | 717.3 |
| 100 | 15.7 | 40.9 | 81.7 | 122.6 | 204.3 | 340.4 | 612.8 |
| 150 | 14.2 | 37.0 | 74.0 | 111.0 | 185.0 | 308.4 | 555.1 |
| 200 | 13.2 | 34.5 | 69.0 | 103.4 | 172.4 | 287.3 | 517.2 |
| 250 | 12.1 | 32.5 | 65.0 | 97.5 | 162.4 | 270.7 | 487.3 |
| 300 | 10.2 | 30.9 | 61.8 | 92.7 | 154.6 | 257.6 | 463.7 |
| 325 | 9.3 | 30.2 | 60.4 | 90.7 | 151.1 | 251.9 | 453.3 |
| 350 | 8.4 | 29.6 | 59.3 | 88.9 | 148.1 | 246.9 | 444.4 |
| 375 | 7.4 | 29.0 | 58.1 | 87.1 | 145.2 | 241.9 | 434.5 |
| 400 | 6.5 | 28.4 | 56.9 | 85.3 | 142.2 | 237.0 | 426.6 |
| 425 | 5.5 | 28.0 | 56.0 | 84.0 | 140.0 | 233.3 | 419.9 |
| 450 | 4.6 | 27.4 | 54.8 | 82.2 | 137.0 | 228.4 | 411.1 |
| 475 | 3.7 | 26.9 | 53.9 | 80.8 | 134.7 | 224.5 | 404.0 |
| 500 | 2.8 | 26.5 | 53.0 | 79.5 | 132.4 | 220.7 | 397.3 |
| 538 | 1.4(3) | 24.5 | 48.9 | 73.3 | 122.1 | 203.6 | 366.4 |
| 550 | 1.4(3) | 23.6 | 47.1 | 70.7 | 117.8 | 196.3 | 353.4 |
| 575 | 1.4(3) | 20.8 | 41.7 | 62.5 | 104.2 | 173.7 | 312.7 |
| 600 | 1.4(3) | 16.9 | 33.8 | 50.6 | 84.4 | 140.7 | 253.2 |
| 625 | 1.4(3) | 13.8 | 27.6 | 41.4 | 68.9 | 114.9 | 206.8 |
| 650 | 1.4(3) | 11.3 | 22.5 | 33.8 | 56.3 | 93.8 | 168.9 |
| 675 | 1.4(3) | 9.3 | 18.7 | 28.0 | 46.7 | 77.9 | 140.2 |
| 700 | 1.4(3) | 8.0 | 16.1 | 24.1 | 40.1 | 66.9 | 120.4 |
| 725 | 1.4(3) | 6.8 | 13.5 | 20.3 | 33.8 | 56.3 | 101.3 |
| 750 | 1.4(3) | 5.8 | 11.6 | 17.3 | 28.9 | 48.1 | 86.7 |
| 775 | 1.4(3) | 4.6 | 9.0 | 13.7 | 22.8 | 38.0 | 68.4 |
| 800 | 1.2(3) | 3.5 | 7.0 | 10.5 | 17.4 | 29.2 | 52.6 |
| 816 | 1.0(3) | 2.8 | 5.9 | 8.6 | 14.1 | 23.8 | 42.7 |

Notes
(1) At temparatures above 538°C, use only when the carbon content is 0.04% or higher.
(2) Not to be used over 345°C.
(3) Not to be used over 455°C.
(4) Not to be used over 538°C.
(5) Flanged-end valve ratings terminate at 538°C.

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