

BALL VALVES FOR DISTRICT ENERGY

The valves used in district heating systems are subject to a number of performance-determining requirements that go far beyond a simple on/off application. This is based on special applications, process conditions and installation situations that typically occur in the district energy sector. With this in mind, it is necessary that valves fulfill the performance-determining parameters in order to guarantee a long-lasting and sustainable solution. Klinger Fluid Control therefore has 2 key products in its range that meet these requirements.



BALLOSTAR KHI
PN16/25/40
DN150 – 800
Material: Cast steel
Temperature range: -45°C to +260°C
Designs: Flanged, with weld ends
Fully welded
Tightness acc. EN12266-1, P10,P11,P12
Fully welded version test/certified acc. EN488:2019 and EHP003



MONOBALL KHO
PN16/25/40
DN15 – 250
Material: Cast steel
Temperature range: -5°C to +200°C
Designs: Flanged, with weld ends
Fully welded
Tightness acc. EN12266-1, P10,P11,P12
Fully welded version test/certified acc. EN488:2019 and EHP003

PERFORMANCE DETERMINING PARAMETERS

Easy operation

- » 100% operational availability - 365 days
- » Valve must be ready even with limited actuations
- » Testing of the actuating torque in-house possible. Tested forces not only according to EN488, but as well according to the higher demand of the FW401

Valve features (1) : Pre-stressed Sealing system, Stiff valve body design, Chrome-coated ball

Improved safety

- » Highest reliability
- » Design temperature 200°C of the valves guaranteed highest degree of fail safety
- » Tested actuations during full differential pressure at 200°C
- » Force absorption by trunnion mounting

Valve features (2) : Tested with 200°C and >20 bar full differential pressure, Multiple Stem Sealing, Trunnion mounted for larger sizes

Pressure losses

- » Tremendous rise of energy cost
- » Lower pressure losses = less pumping energy
- » No turbulences due to streamlined construction design

Valve features (3) : Cylindrical passage area of the ball, total cost savings

Pipe force transmission and absorption

- » Development of high pipe forces due to cold installation of the network and afterwards heating up to 90° - 130°C
- » Casted stem → no critical welding seam at shaft area
- » Force flux optimization

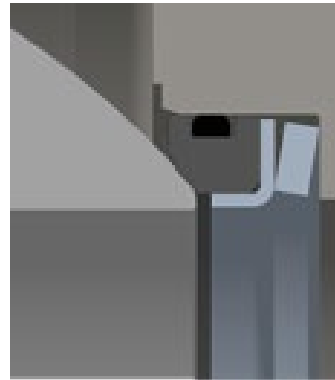
Valve features (4) : Full penetration welding of the total cross section, no stress cracking, in-house testing rig for EN488 and FW401

VALVE FEATURES (1)

KLINGER Sealing systems



Valve can be pressurized from both directions (bi-directional)
 The elasticity of the sealing elements is compensating thermal expansions
 Seat tightness is reached due to two elastic, independent working sealing elements



Valve can handle the pressure from both sides (bi-directional)
 Construction with Belleville washer – this leads to a constant surface pressure of the sealing ring
 Unsusceptible to variation in temperature and pressure surge
 Back up sealing ring contains the dead chamber

Competitor sealing systems



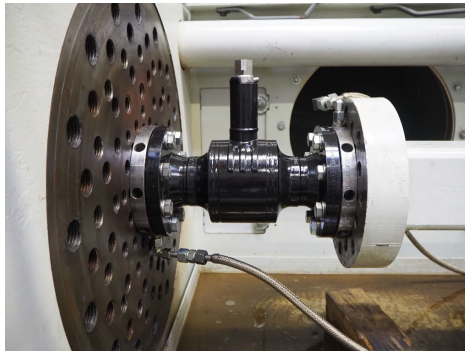
Construction made of a simple sealing ring. Temperature peaks from the system can deform the seal ring → Sealing function is not guaranteed anymore.



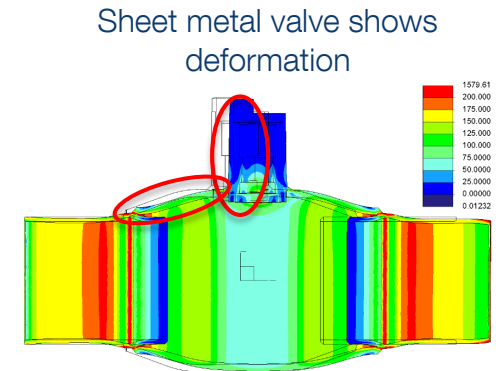
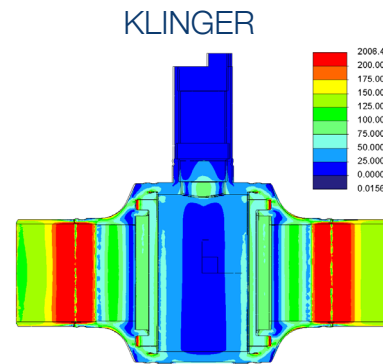
Construction is spring loaded. The system is susceptible to solids and can easily become clogged, which can lead to a blockage of the valve. Furthermore particles can come into the cavity which leads to corrosion.

VALVE FEATURES (1)

KLINGER stiff valve body design – comparison with a sheet metal ball valve



Both valves simulated/tested with same tensile force
Less valve body deformation leads to constant operating torques



KLINGER chrome coated ball

Hard chrome plated ball after 20 years in service (DH / Vienna)

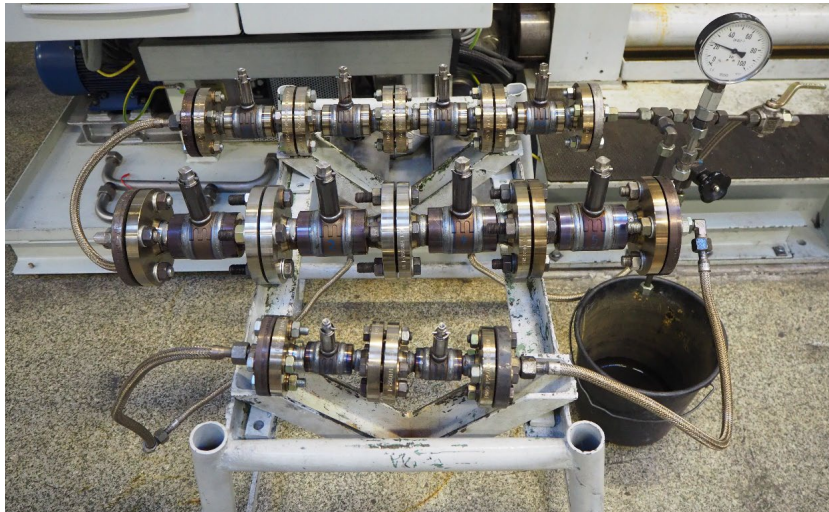


| | Execution | Hardness | Surface roughness after use (RZ) |
|----------------|--------------------|---------------|----------------------------------|
| KLINGER | Hard chrome plated | 800 – 1000 HV | small |
| Competitor | Nickel plated | 500 – 650 HV | medium |
| | Stainless steel | 300 – 350 HV | high |

VALVE FEATURES (2)

High temperature/pressure tests analysis

Pressure and temperature tests and analysis where performed over months to identify all possible failures



Multiple stem sealing



Competitors show leakage after 200°C (without pressure) at the stem as well as in-line



Stem sealing Monoball KHO:

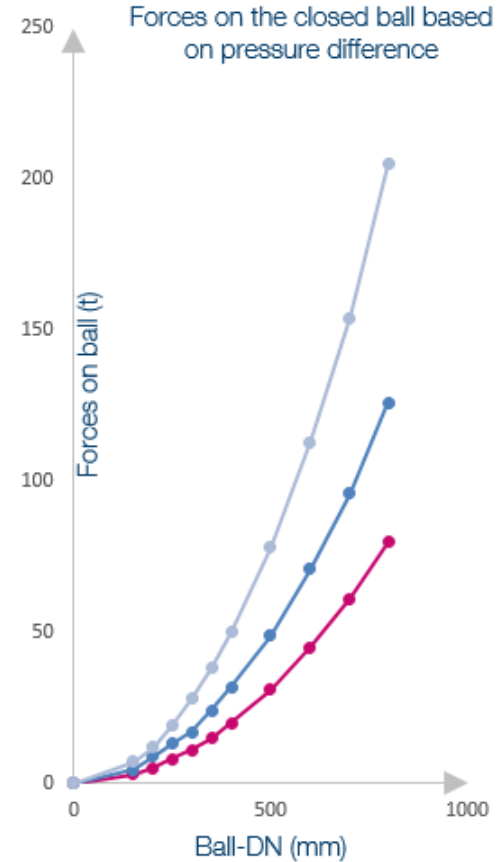
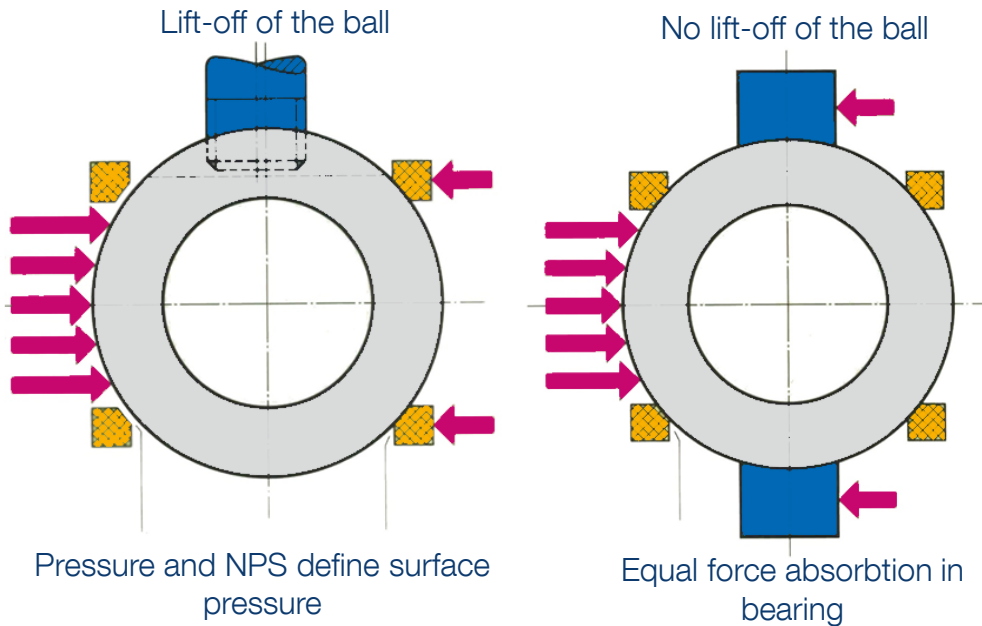
Double high temperature O-ring sealing
Reliable sealing at 200°C

Underground version:

- DN80 additional O-ring on the bottom of stem
- Double bearing of stem (top and bottom)
- Full stem construction out of stainless steel
- Exchangeable on site

VALVE FEATURES (2)

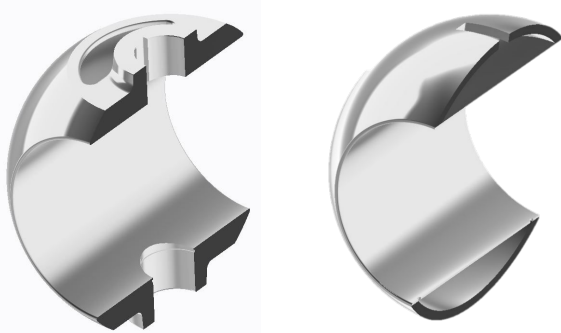
Ball trunnion mounted



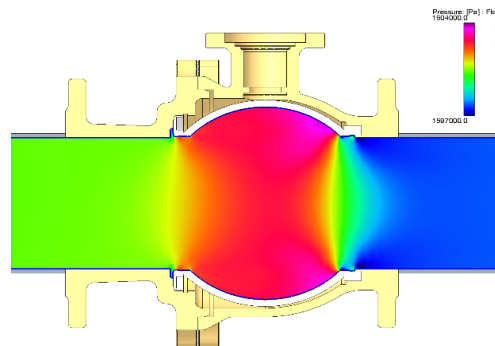
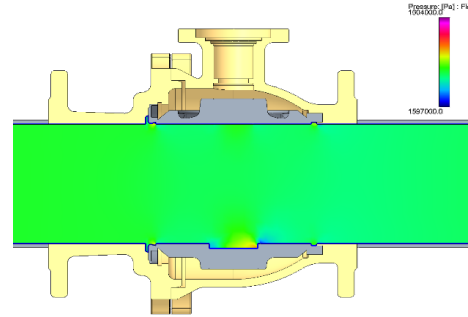
VALVE FEATURES (3)

Cylindrical passage of the ball, total cost savings

Solid ball and hollow ball with guide tube with cylindrical passage area
 KLINGER BALLOSTAR KHI and MONOBALL KHO (hollow ball with guide tube for larger sizes)



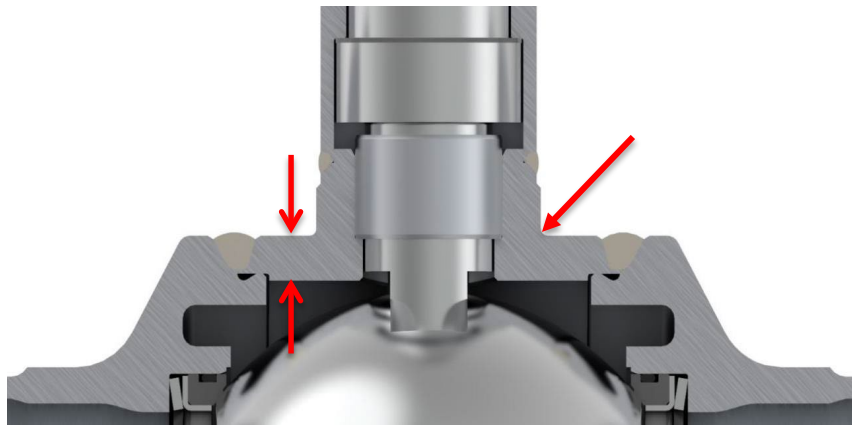
Hollow ball – no cylindrical passage creates turbulences and high pressure loss



- Cylindrical passage vs. Hollow ball
- ✓ No turbulences
 - ✓ Lower pressure losses
 - ✓ Less pumping energy required
 - ✓ Total cost savings

VALVE FEATURES (4)

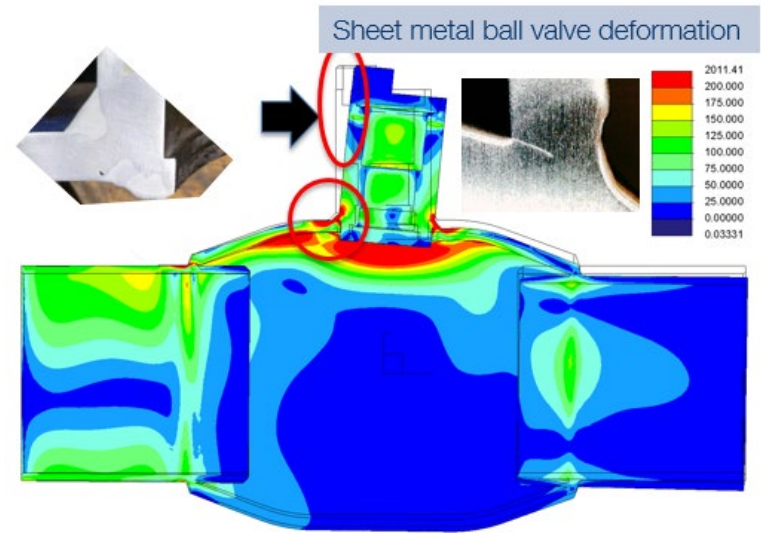
Full penetration welding – no stress cracking



More robust one-piece cast steel housing with molded ball valve stem

No welding seam at the flux of forces

Based on the full penetration welding no media or dirt can enter the cracks – no crack corrosion possible



Comparison of forces on a KLINGER ball valve with molded valve stem and a sheet metal ball valve

The weak stem construction at sheet metal ball valves lead to high forces where the welding's are placed -> risk of cracks

VALVE FEATURES (4)

In-house testing rig for EN488 and FW401

