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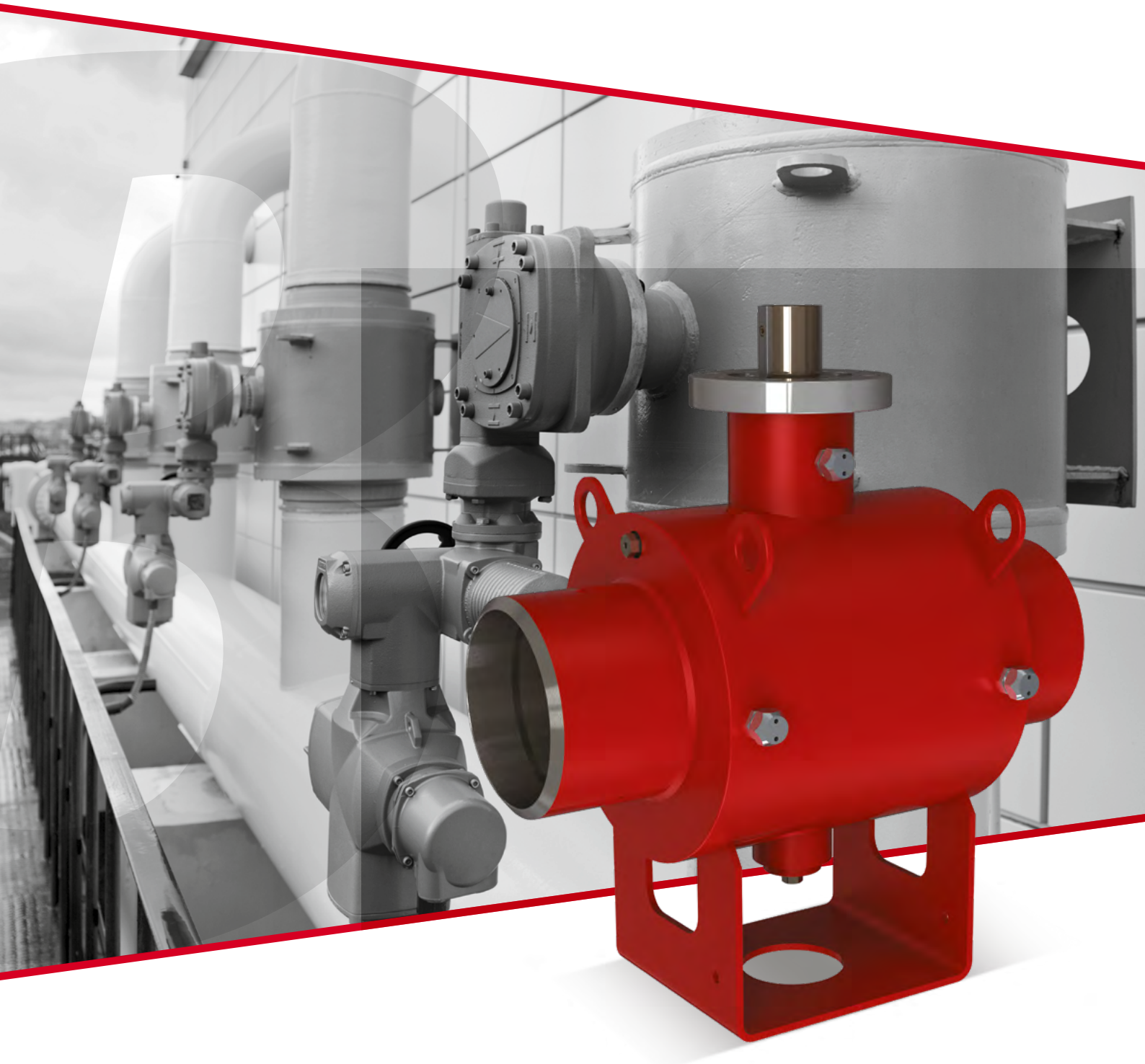
BROEN
VALVE TECHNOLOGIES

BROEN BALLOMAX® TYPE AH BALL VALVES
for gas and fuel



BROEN BALLOMAX®

Designed to last

Global company, local knowledge

BROEN was founded in 1948 and was one of the pioneers in the development of the district heating network in Denmark. With time, BROEN became a world-leading manufacturer of ball valves. The BROEN offer also features ball valves for gas and fuels which rely on nearly 40 years of experience.

At present, BROEN is a global enterprise with 5 production plants in Denmark, Poland, and the United States, with over 600 employees, and distributing its products to more than 50 countries worldwide.

Since 1993, BROEN has been part of the Aalberts Group (AALB) that is present on the EuroNext Stock Exchange in the Netherlands.

Our vision is simple: we strive to be the best in the development of ball valve technology. This is fundamental for our business and leads us to become strong and stable business operating within the time zones of three continents.

Our continuously expanded offer of ball valves, constant search for new technological solutions, and a broad network of local partners and distributors allow us to always be close to our customers and provide them with flexible top-quality services and cutting-edge products of the highest grade.

More information at:
www.broen.pl and www.aalberts.com.

SCOPE OF PRODUCTION

The largest part of BROEN production constitute BALLOMAX® ball valves with accessories for heating systems, which are the company's flagship product and showcase. In 2008, the BROEN product portfolio was expanded with BROEN BALLOMAX® type AH ball valves for gas and fuels, due to the acquisition of a production plant in Poland, specializing in the design, production, supply and service of valves for the gas and petrochemical industry since 1983.

Ball valves from this product family are utilized in gas, petrochemical, refinery, chemical, district heating and industrial installations. They are used for various types of media, including:

GAS

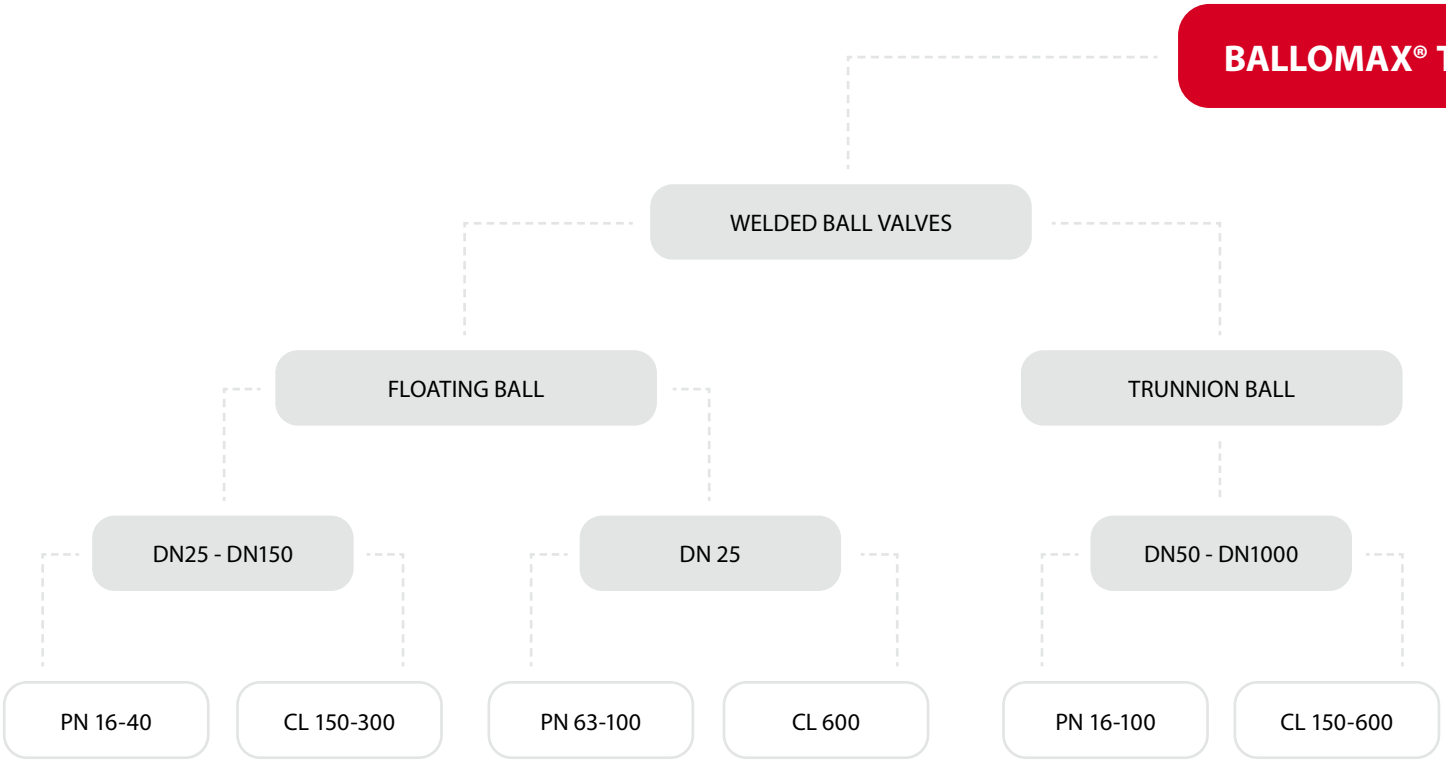
Natural gas
Other gas mixtures

FUELS

Diesel
Propane / Butane / LPG
Gasoline
Jet A1

OILS

Oil
Light fractions of crude oil
Pentane, hexane
Other petroleum products



BROEN
VALVE TECHNOLOGIES

BROEN BALLOMAX® type AH ball valves are used at the production, processing, transmission and distribution stages.

EXTRACTION

Offshore mining platforms

Mines

TRANSMISSION

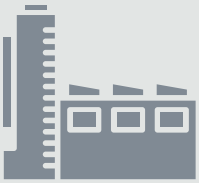
Processing and storage

Transmission pipelines

Transport

DISTRIBUTION

Distribution



Refining and purification

E AH BALL VALVES

- SPLIT BODY BALL VALVES
  - FLOATING BALL
    - DN15 - DN25
      - PN 16-100
      - CL 150-600
  - TRUNNION BALL
    - DN25-DN300
      - PN 16-400
      - CL 150-2500

Our brand is our promise

BROEN is a guarantee of highest quality.
BROEN manufactures ball valves based on the EN ISO 9001 Quality Management System. Every product of the company meets the requirements of the Pressure Equipment Directive 2014/68/EU (PED) - Module H.
The solutions and materials used in production are subject to multiple checks and stress tests at the company's research laboratory. This allows for selection and choice of only the best technological and material solutions that entirely meet the expectations of the most demanding customers and installations.
Each of the BROEN BALLOMAX® type AH ball valves is subject to full quality control and pressure tests, which guarantee tightness and reliability of products.

List of the most significant certificates

CE certificate (PED 2014/68/UE)	CE mark Module H. Ball valves – design, production, control of finished product and pressure testing.
API Spec Q1 and API-6D certificate	Specification for ball valves and piping according to the American Petroleum Institute. Approval to mark valves with API Monogram.
Euroheat & Power certificate	Quality check. District heating valves according to the requirements of Euroheat & Power Certification and conformity with the standard EN 488.
Fire Safe Trunnion Ball Certification	Fire endurance verification of ball valves according to EN ISO 10497 – trunnion ball.
Fire Safe Floating Ball Certification	Fire endurance verification of ball valves according to EN ISO 10497 – floating ball.
Fire Safe Metal-Metal Certification	Fire endurance verification of ball valves according to EN ISO 10497 – metal-to-metal sealing.
EN ISO 3834-2 certificate	Confirmation of the quality requirements in the welding system.
EN ISO 9001 certificate	Design, production, sales and service of ball valves and metalworking services.
ISO 45001 certificate	Occupational health and safety management system.
SIL EN 61508-1 certificate	SIL 2. Safety Integrity Level.
EN 488 certificate	Valves intended for pre-insulation. Confirmation of compliance with EN 488 standard.
EN 14141 certificate	Valves for transportation of natural gas in pipelines. Performance requirements and testing.
AD 2000-Merkblatt HP0 certificate control and HP 100R	Manufacturing and welding standard control.
AD 2000-Merkblatt A4 certificate	Design and production of pressure vessels.
AD2000 certificate – transfer of markings	System for transferring of material markings in compliance with the requirements of standard AD 2000.
СЕРТИФІКАТ ВІДПОВІДНОСТІ	Conformity based on full quality assurance (Module H). Ukrainian market.
TP TC 032/2013	Compliance with the requirements of the Technical Regulations of the Customs Union on the safety of equipment operating under pressure.
TP TC 012/2011	Compliance with the requirements of the Technical Regulations of the Customs Union on the safety of equipment for operation in potentially explosive environments.
TP TC 010/2011	Compliance with the requirements of the Technical Regulations of the Customs Union on the safety of machinery and equipment.

CREDENTIALS

Every year BROEN's five production facilities produce over 3 million ball valves for heating, cooling, gas, petrochemical and fuel industries.
Products are distributed to over 50 countries around the world.

BROEN BALLOMAX type AH ball valves have been successfully delivered and operated at the facilities of the largest operators of gas and fuel pipelines. The most important users of our products include:

Credentials

Amber Grid (Lithuania)	Naftohaz (Ukraine)
Dong Energy / Orsted (Denmark)	NIS (Serbia)
Elering (Estonia)	OMV Group (Austria)
Eustream a.s. (Slovakia)	Pern S.A. (Poland)
FGSZ Ltd. (Hungary)	PGNiG S.A. (Poland)
Ga-Ma (Macedonia)	PKN Orlen SA (Poland)
Gas Connect (Austria)	PSG Sp. z o.o. (Poland)
Gas Storage (Poland)	SPP a.s. (Slovakia)
Gas Transmission Company Ltd. (Bangladesh)	Srbijagas (Serbia)
Gaspol (Poland)	Transgaz (Romania)
Gaz-System S.A. (Poland)	Trans Austria Gasleitung GmbH (Austria)
Grupa Lotos S.A (Poland)	Turkmengas (Turkmenistan)
Latvija Gas (Latvia)	Ukrtransgaz (Ukraine)
MOL Group (Hungary)	

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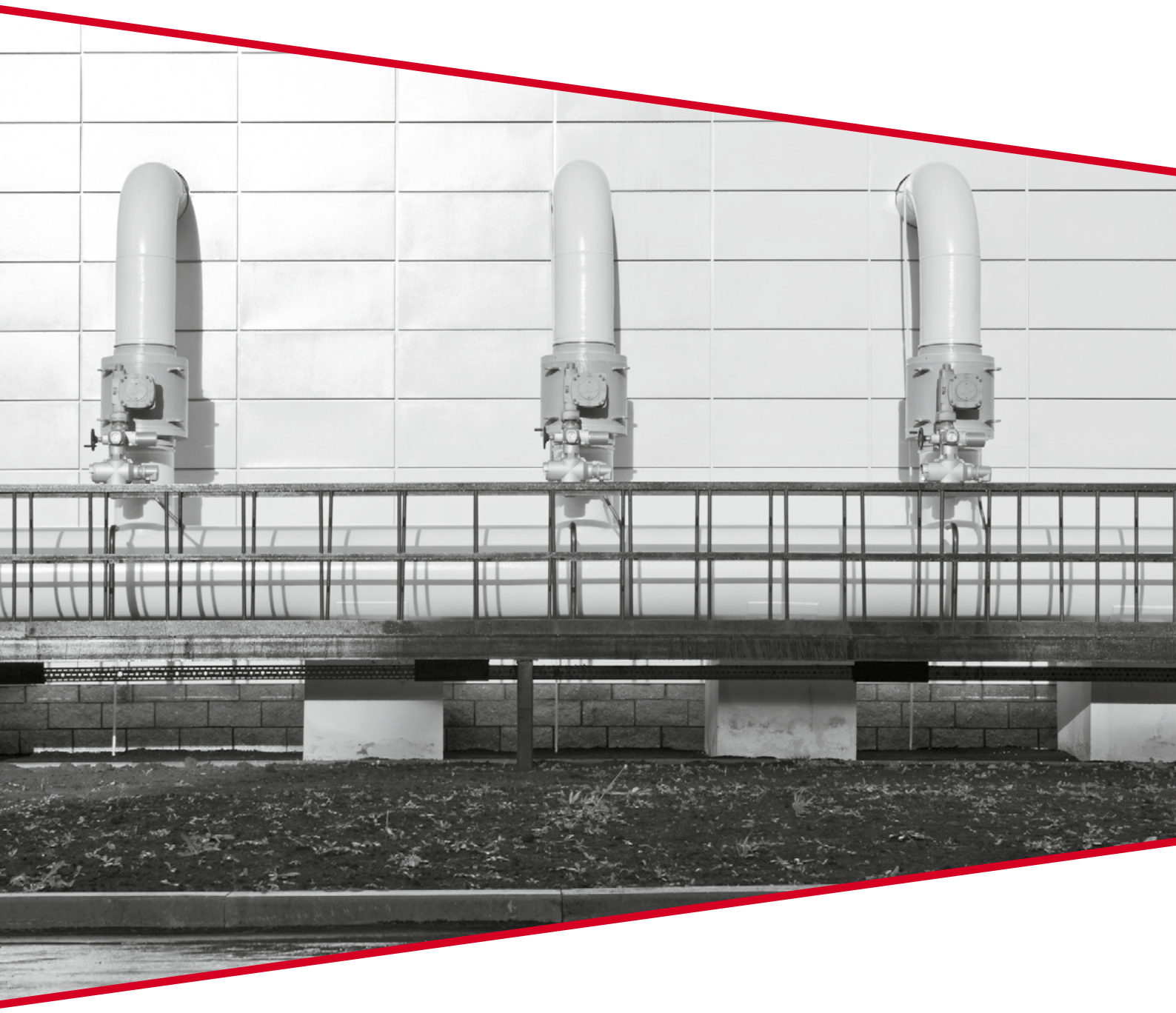
BROEN
VALVE TECHNOLOGIES

TECHNICAL GUIDE



BROEN
BALLOMAX®

Designed to last

Fully welded ball valves

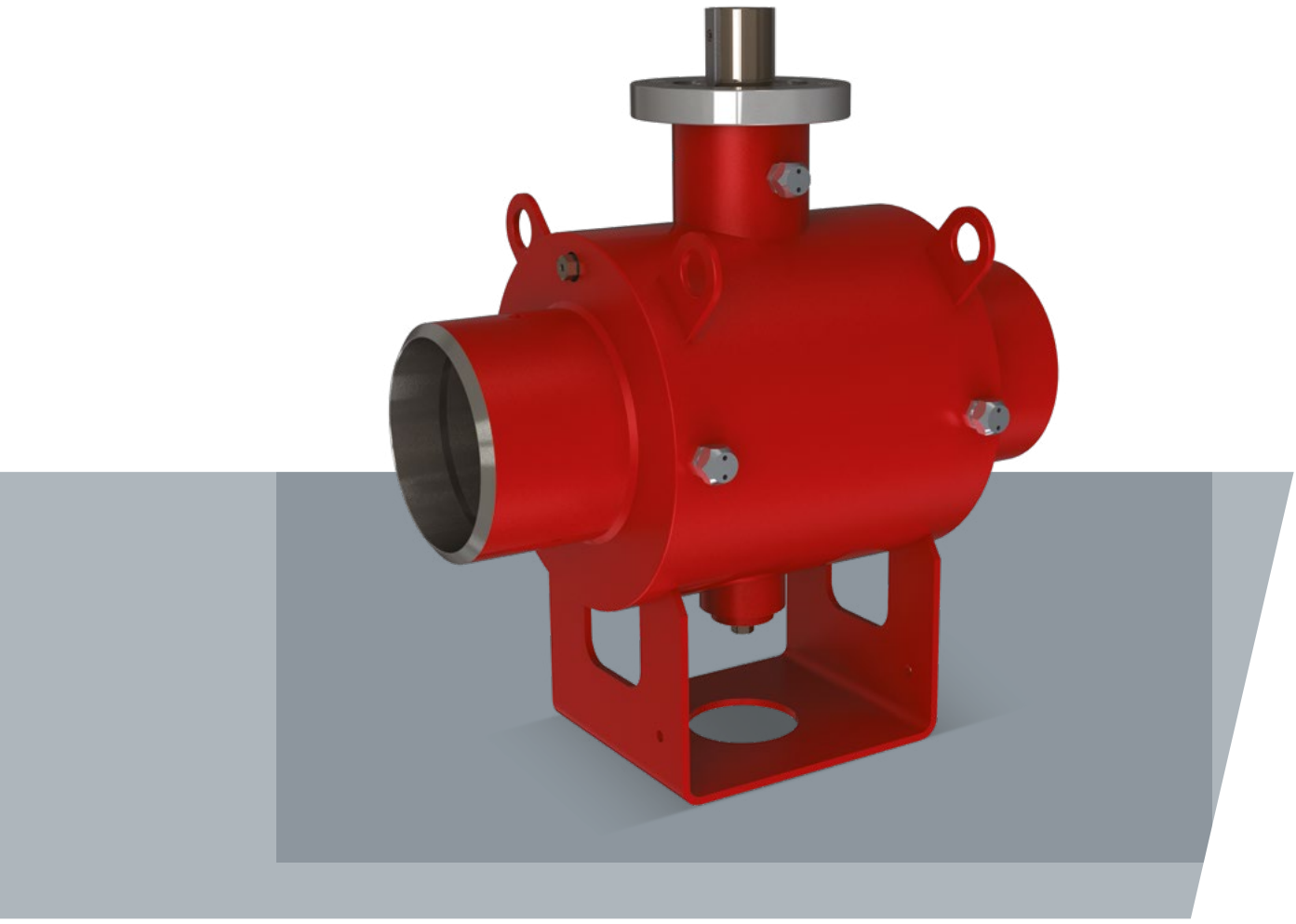
Fully welded ball valves are characterized by a design in which all the main pressure components such as the body, flange or welding ends are permanently connected by a welding process. Permanent welded connection guarantees 100% tightness of the body, not only due to the high-quality welds, but also thanks to the 100% non-destructive testing in accordance with EN 14141, confirming their impeccable performance. All elements of fully welded valves meet the requirements of the Pressure Equipment Directive 2014/68/EU (PED) or API-6D standard and additional customer requirements. The main components of BROEN BALLOMAX® type AH fully welded ball valves are carbon steels designed to work under pressure.

Advantages:

- Smaller weight compared to a split body ball valve with the same parameters.

Remarks:

- Fully maintenance-free valves ensure a long lifetime (it is not possible to disassemble the valve).



Split body ball valve

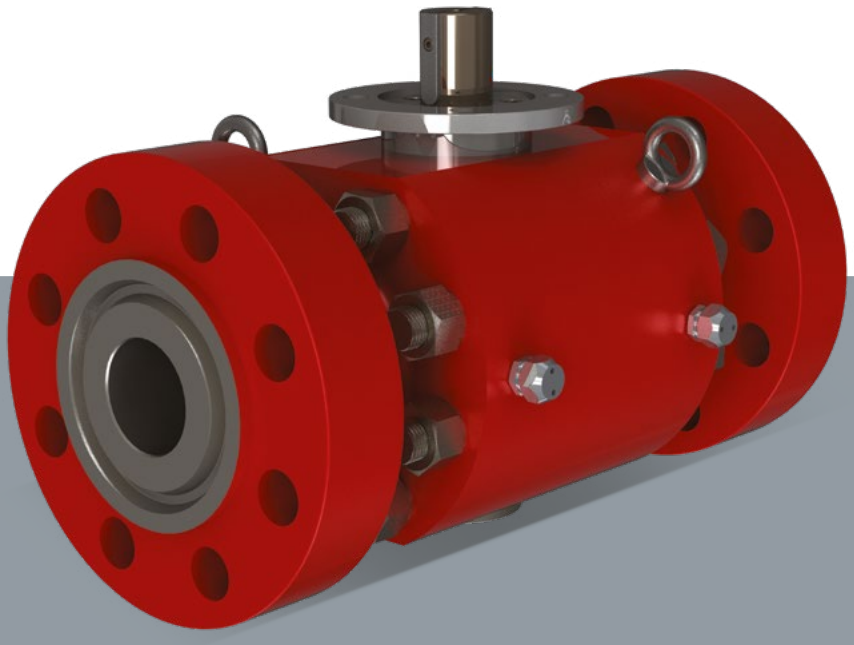
Ball valves are screwed with „separable" parts, where all individual elements are not permanently connected. Such design makes it possible to dismantle the fittings into individual components, and thus to replace them, e.g., sealing exchange. Split body ball valves are usually utlized where the use of fully welded fittings is very difficult and impractical. All elements of split body ball valves meet the requirements of the Pressure Equipment Directive 2014/68/EU (PED) or API-6D standard and additional customer requirements. The main components of BROEN BALLOMAX® type AH split body ball valves are carbon steels, stainless steels and special steels, e.g., DUPLEX.

Advantages:

- The ability to easily regenerate the valve,
- The possibility of using special materials, e.g., non-weldable materials,
- Can be used in harsh working conditions.

Remarks:

- Greater weight than fully welded valves.



Floating ball

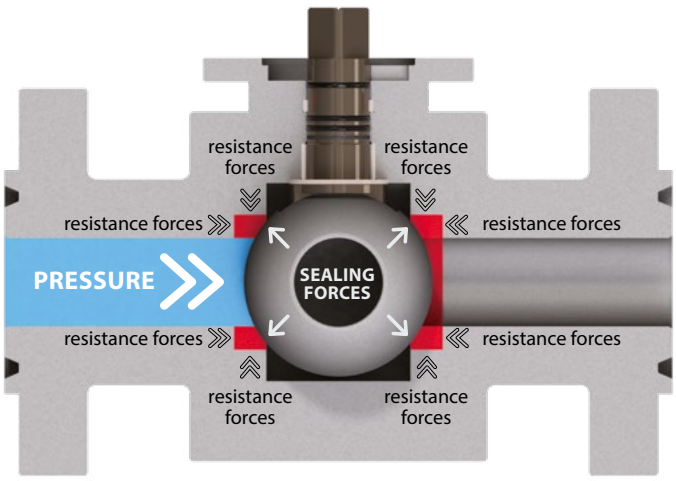
- Floating ball valves are mounted in such a way as to provide an initial tightness between the ball and the seals, causing initial sealing forces.
- At low pressures, both seals act as sealing and ball bearing.
- As the operating pressure increases, the upstream gasket ceases to function as a ball sealing and bearing, and the pressure of the ball on the downstream gasket increases.
- To guarantee tightness in the low-pressure range (up to 5 bar), the initial tightness between the ball and the seal should not be lost by:
  - overloading the valve with pressure,
  - introduction of excessive thermal stresses (exceeding the permissible temperature range).

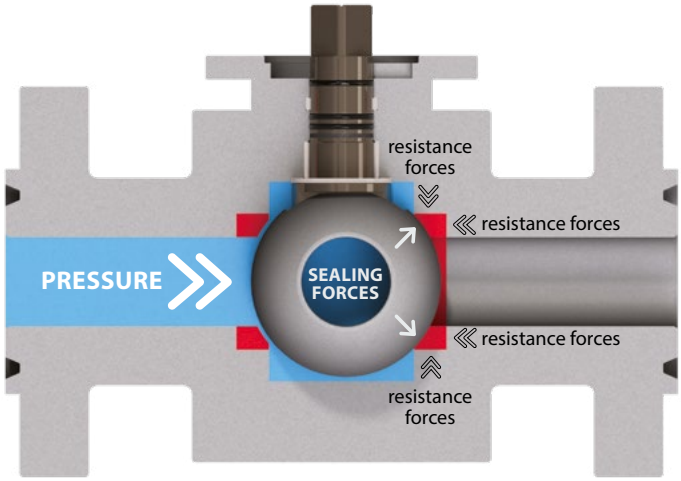
Advantages:

- Simple design,
- Possibility of shortern design.

Remarks:

- Higher torque compared to trunnion ball valves,
- It is not recommended for use with a medium with a high coefficient of thermal expansion,
- The solution is mainly used for low pressures and small DN sizes.





» IMPORTANT!

The assembly process of floating ball valves includes introduction of the initial compressive stresses between the (metal) ball and the seals (e elements - different, depending on the materials they are made of. A significant difference in the linear expansion coefficients for metals and pl of the plastic. After cooling down, such a valve loses initial assembly stresses. Its tightness guarantee decreases, especially in the low-pressure ra In order to eliminate the influence of thermal stresses, it is recommended to use ball valves with volumetric compensation.

Compensation type floating ball

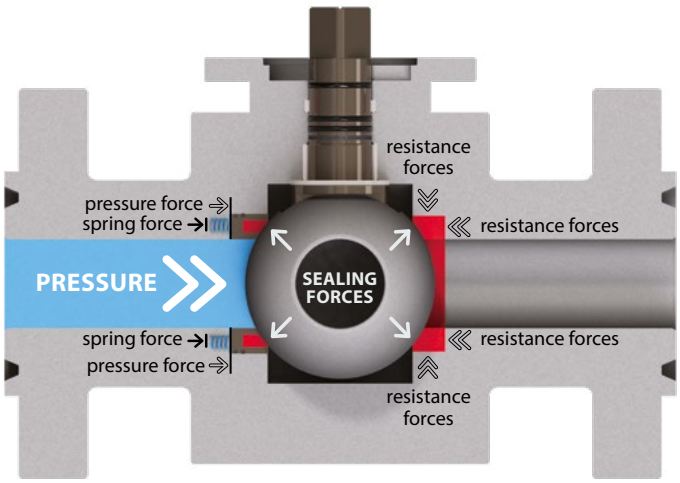
- A floating ball valve equipped with a compensation system may have one or two compensation seals which, by means of initial pressure from the spring force, guarantee tightness in the full operating range of the valve.
- Tightness at low pressures is ensured by springs generating an initial clamp, which play an auxiliary role during pressure increase.
- The bearing function in the compensation type ball valve is taken over by the gasket at the downstream.
- The use of double compensation in the ball valve (appropriately designed) allows to obtain tightness on both seals. If the upstream gasket is damaged, the sealing function is performed by the outlet gasket.
- The compensation function in the ball valve allows the use of this type of fittings for media with a high coefficient of thermal expansion, e.g. oils, fuels, alcohols, LPG, etc.
- The construction of the floating ball valve equipped with a compensation system completely eliminates any stress effects caused by temperature changes. The compensation system has been designed in accordance with the requirements of API 6D/EN 13942 standards and works up to 133% of the nominal valve pressure.

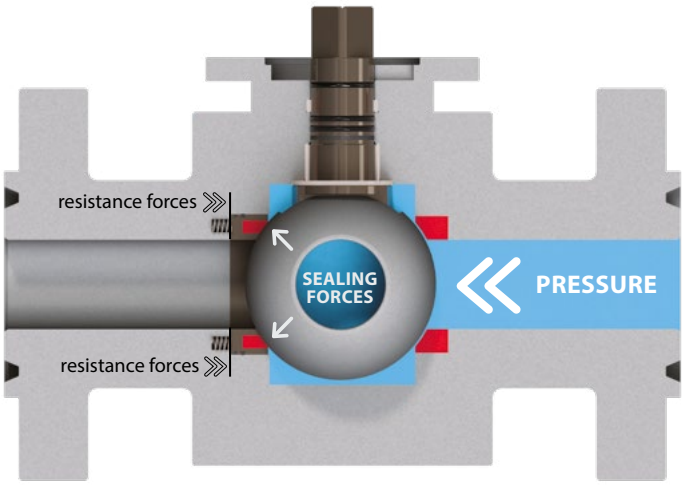
Advantages:

- Simple design,
- Wide range of operating temperatures,
- Possibility of shortern design,

Remarks:

- Higher torque compared to trunnion ball valves,
- The solution is mainly used for low pressures and small DN sizes.





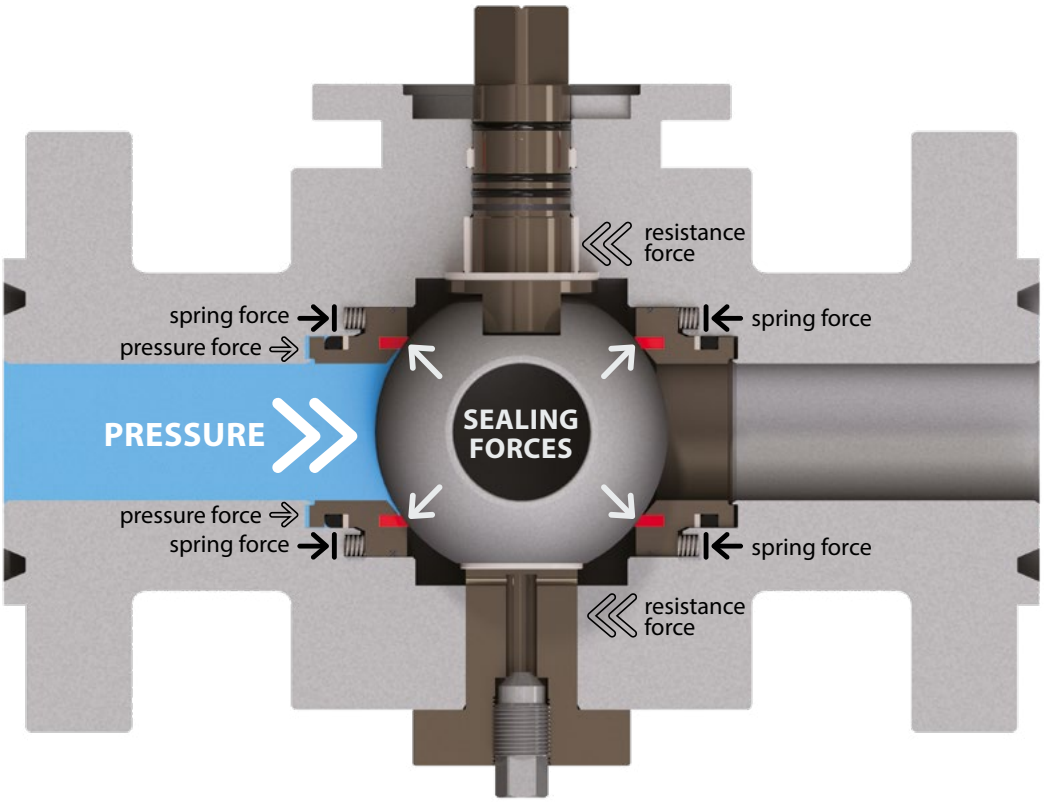
e.g. PTFE, PTFE + C, PEEK + C), which guarantees the tightness of the valve. The temperature change causes dimensional changes of the valve lastics results in the introduction of additional compressive stresses between the ball and the seals, which may jointly exceed the yield strength nge of 0 ÷ 5bar. For the above-mentioned reasons, valves with a floating ball should work in temperatures with moderate or small fluctuations.

Trunnion ball

- The stem and the trunnion play the role of the thrust bearings, holding the ball in the body.
- The sealing function is performed by both seals embedded in sliding seats supported by springs.
- The sealing force of the upstream gasket is provided by the medium pressure and spring forces.
- As pressure increases, the sealing force of the upstream gasket increases.
- For low pressures, the sealing force is provided by springs.
- The construction of the valve with seats working independently of the body and ball ensures tightness of closure regardless of the temperature.

Advantages:

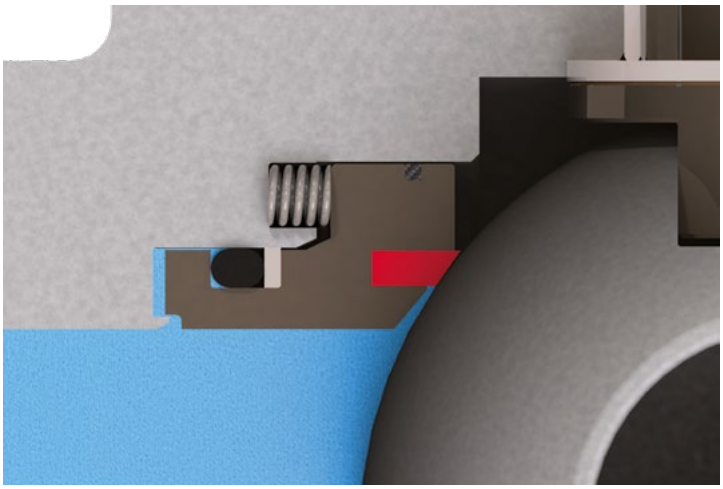
- Can be used with any medium, even those with a high coefficient of thermal expansion,
- Tightness at full differential pressure guaranteed,
- Wide range of application temperatures,
- Low torque,
- Can be used regardless of the valve size (DN),
- Application for low and high pressures.



Tightness of the ball valve is guaranteed by seals made of elastomeric materials, thermoplastics, and even metal, which guarantee the „A" tightness class according to EN 12266-1 (visually undetectable leakage).

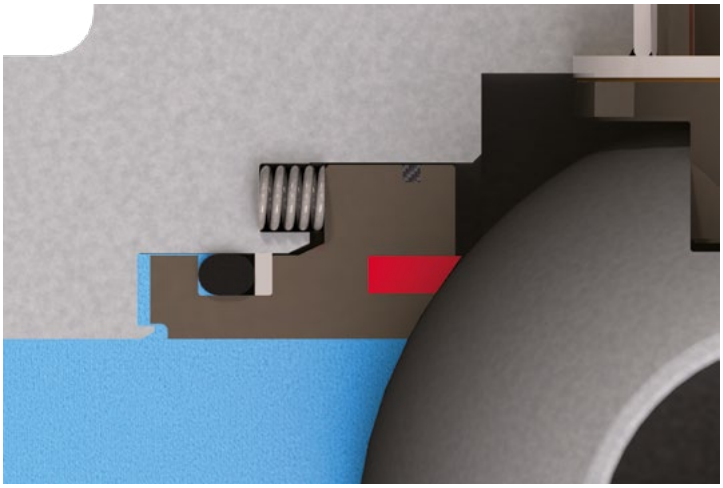
SOFT Soft type sealing

A seal based on a plastic material (e.g. PTFE, PTFE + C, PEEK + C) embedded in a seat made of stainless steel, or carbon steel with a protective chrome or nickel coating.
It is recommended for use with gaseous and liquid media that do not contain solid contaminants.



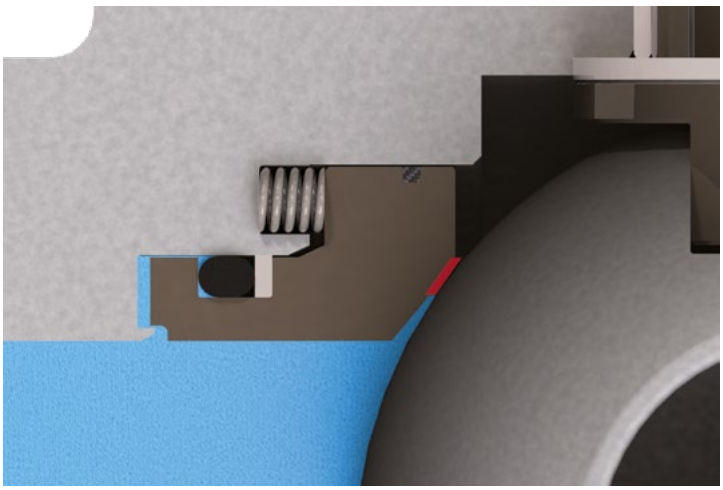
PMSS PMSS type sealing – Primary Metal Secondary Soft

The PMSS system, as the name suggests, is realized by means of two seals working simultaneously.
The metal seal creates a type of protective sealing for the soft seal, which allows the use of such a system for media with numerous solid contaminants. It is recommended to use the PMSS mainly for gaseous media.



M-M Metal-Metal type sealing

The most advanced type of sealing is the Metal-Metal system, where the sealing surfaces of seat and ball are lapped together. Top quality metal-metal sealing guarantee tightness class A according to EN 12266-1 (visually undetectable leakage), which is a standard of BROEN POLAND.



SPE SYSTEM – SINGLE PISTON EFFECT

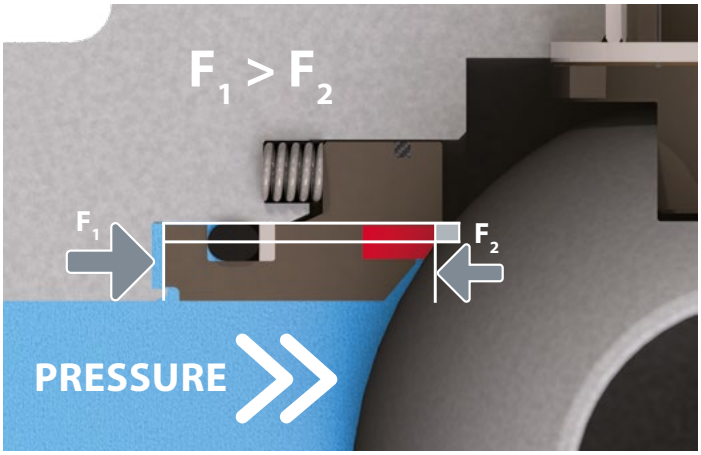
SPE

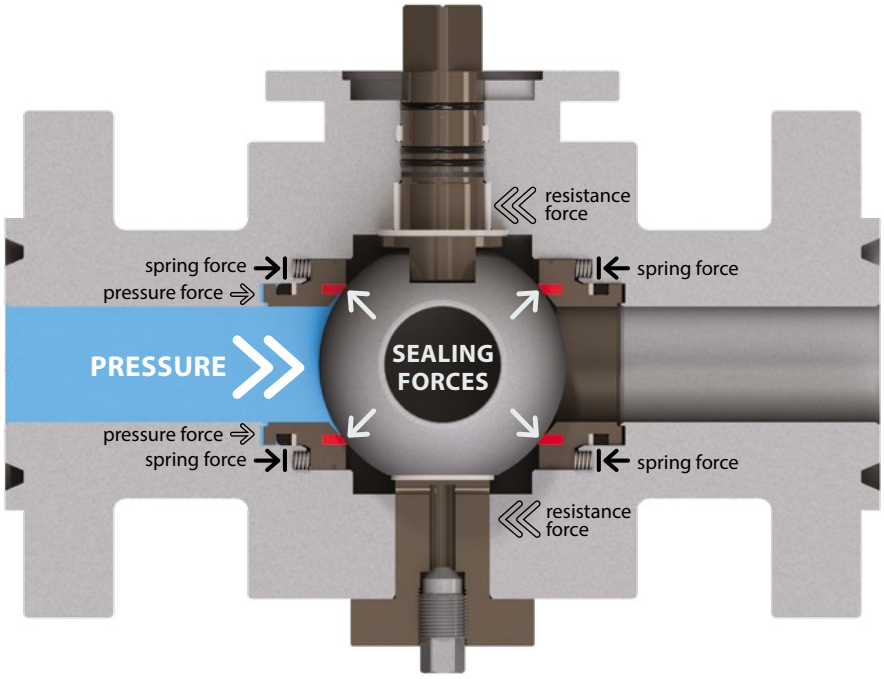
SPE (Single Piston Effect) is a one-way sealing system with a compensation function, preventing excessive pressure build-up in the valve cavity by automatically equalizing the pressure to the value in the installation.

The compensation system used by BROEN complies with API 6D/EN 13942 standards and is max. 133% of the nominal pressure of the valve.

Valves equipped with SPE can work with sealing solutions based on:

- Soft type sealing,
- PMSS type sealing,
- Metal-Metal type sealing.

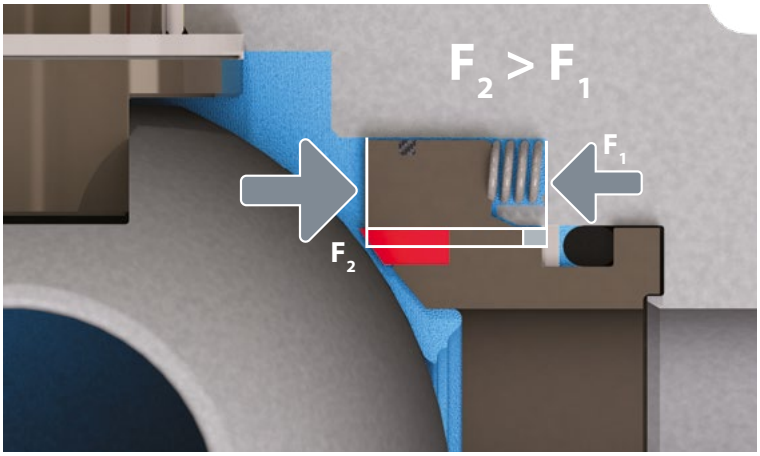


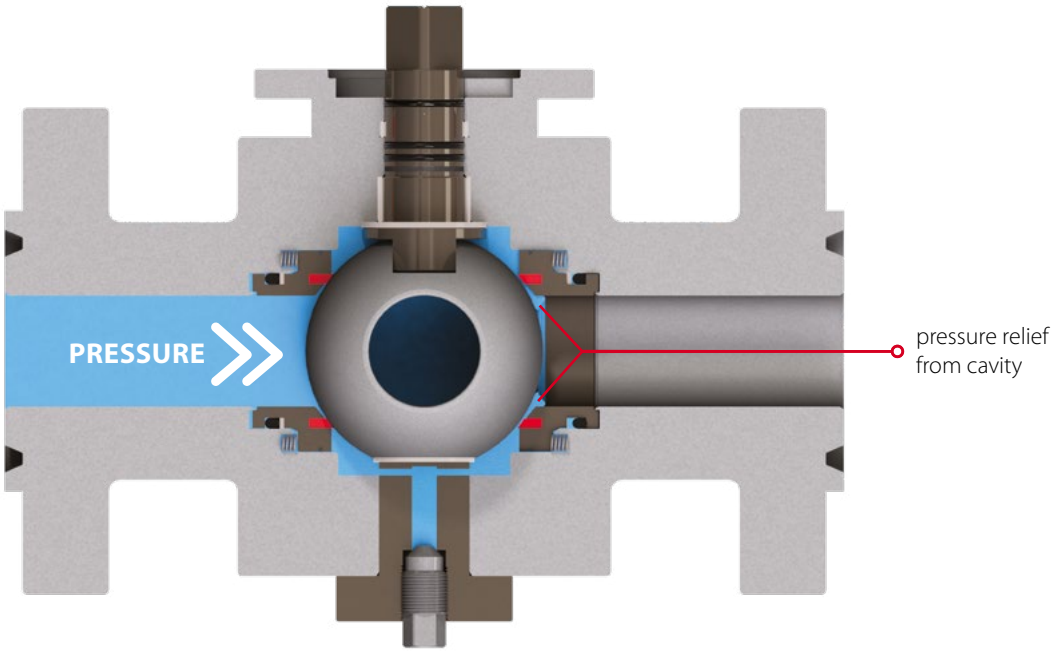


BROEN
VALVE TECHNOLOGIES

Compensation system - principle of operation

The medium enclosed in the valve cavity can obtain a significant increase of pressure due to, e.g., heating it with heat supplied from the outside (especially for liquids with a high coefficient of volumetric expansion); when working with a gas medium, the increase of pressure in the cavity is minimal.
The increase in pressure in the space between the ball and the cavity reduces the value of the sealing forces until the excess volume of the medium is dropped (pressure discharge).



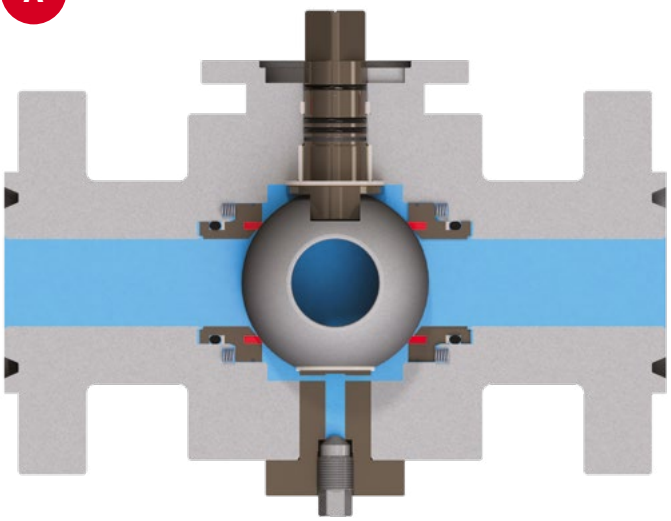


SYSTEM DBB – DOUBLE BLOCK AND BLEED

DBB

The DBB system allows to release the pressure contained in the cavity. Depending on the version, it can operate in closed or open position. This makes it possible to check valve tightness without taking the valve out of service.

A



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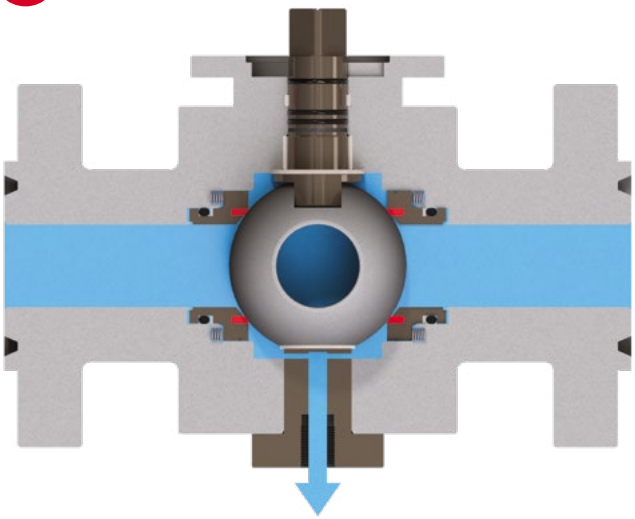
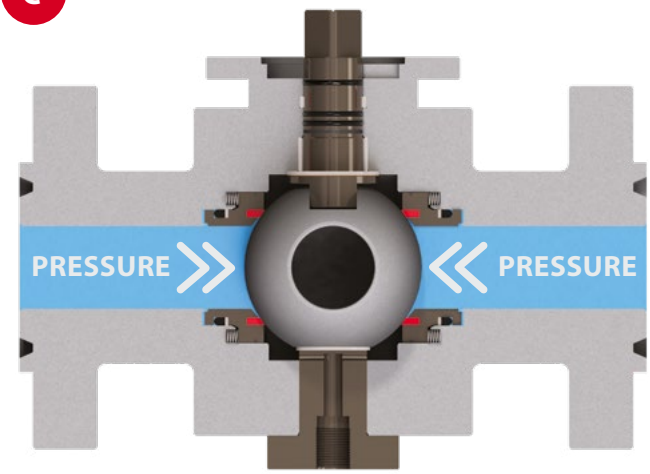


C



» IMPORTANT!

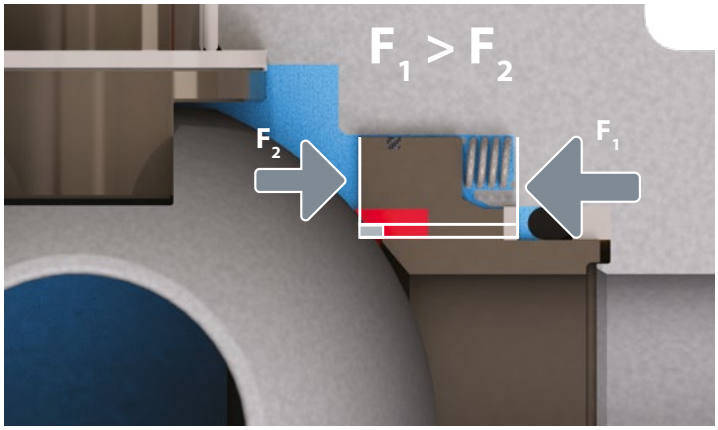
The DBB function ensures tightness of the valve at a pressure on the left and right side of the valve. Both seals on the valve can be equipped with the function SPE, DPE or SPE+DPE.

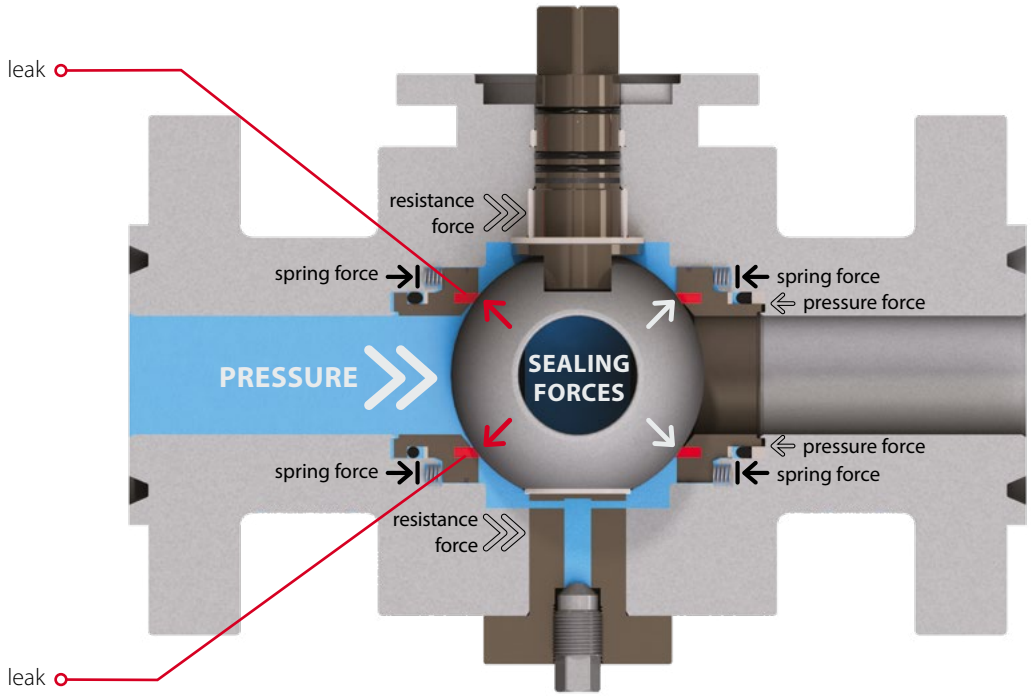
- **A** Both sides of the valve and cavity are filled with the medium.
- **B** Removal of the medium from the cavity.
- **C** Pressure on both sides of the valve. No pressure in the cavity.

DPE SYSTEM – DOUBLE PISTON EFFECT

DPE (DIB-1) DPE (DIB-2)

The DPE sealing system, or the double piston effect system, is a solution that allows to obtain tightness of the valve, regardless of the side from which the seat is loaded with the pressure of the medium. A two-stage sealing system ensures tightness regardless of the pressure side. Such a solution of the sealing system in the DPE system allows to obtain tightness of the fittings, e.g. in the case when the gasket on the upstream side is damaged.





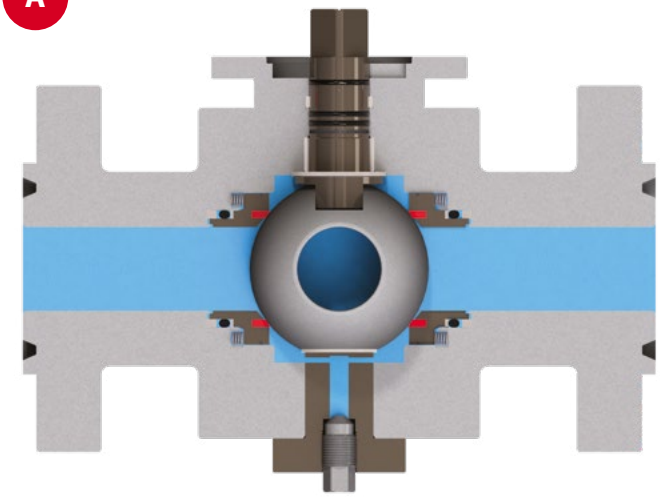
» IMPORTANT!

The DPE system cannot be used for liquid media due to the risk of a sudden increase pressure in cavity, which may damage the valve.

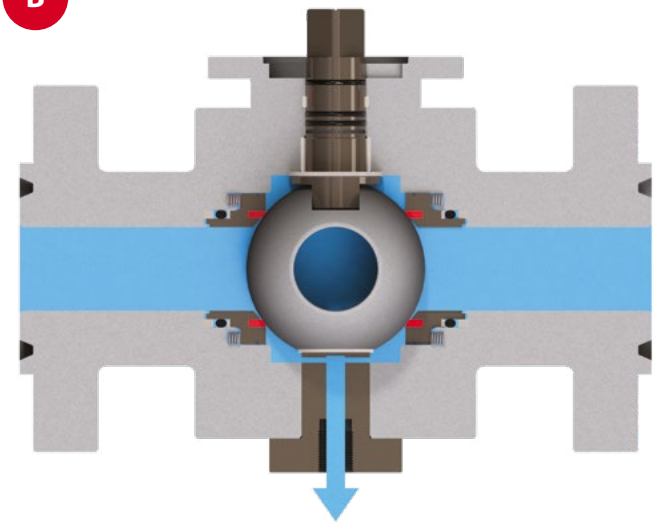
DOUBLE ISOLATION AND BLEED - **DIB1**

BROEN BALLOMAX®

A



B



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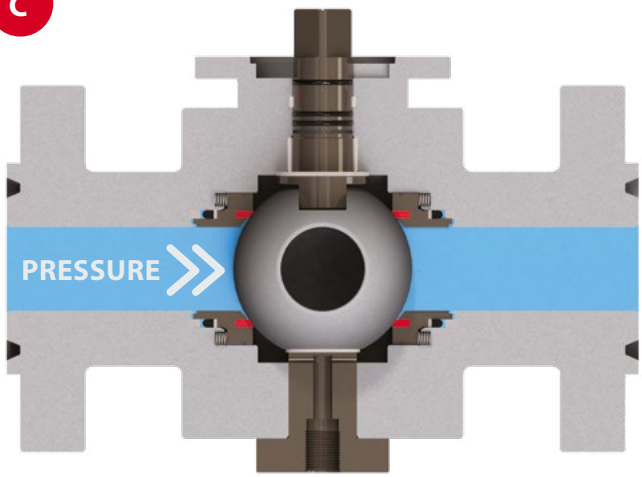

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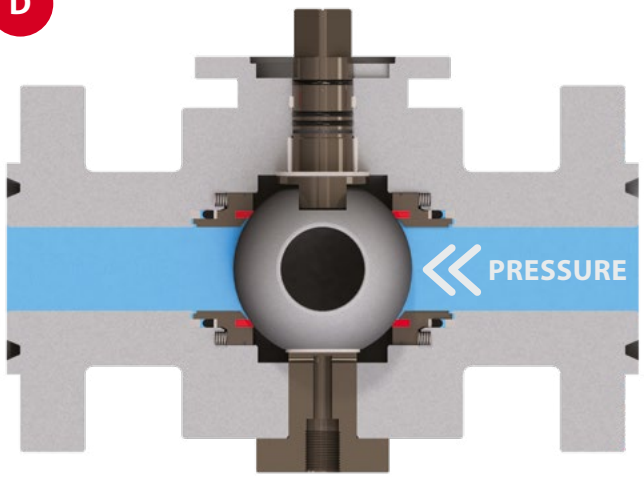

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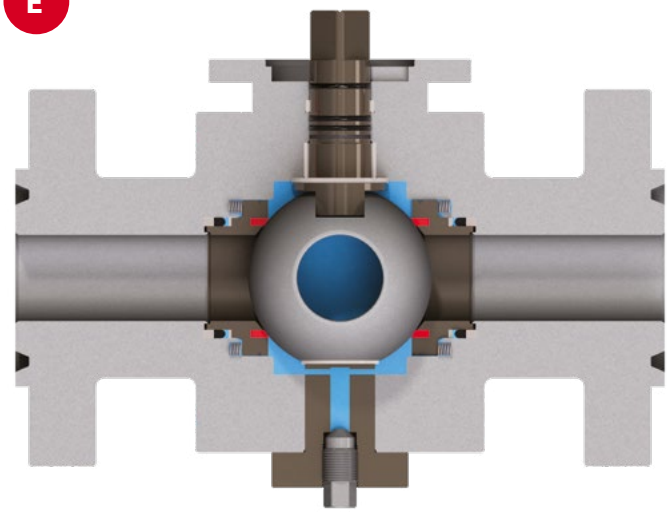


DPE (DIB-1)

» IMPORTANT!

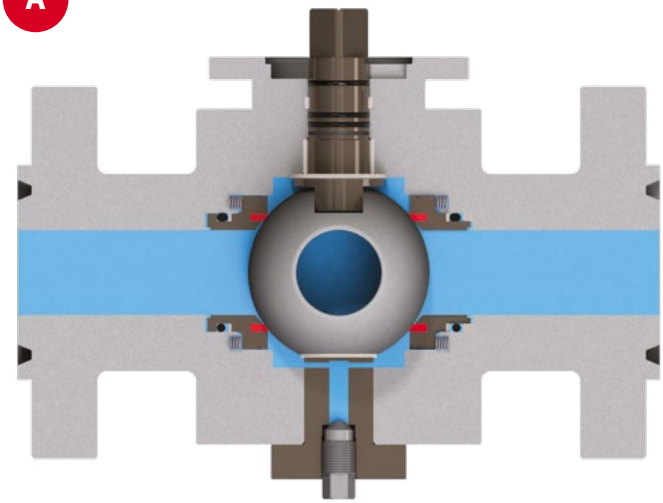
The DIB-1 function ensures valve tightness at a pressure on the left and right side of the valve and when the pressure is closed in the cavity. Both seats of the valve have a DPE function.

- **A** Both sides of the valve with the cavity are filled with the medium.
- **B** Removal of the medium from the cavity.
- **C** Medium pressure on the left side of the valve. No pressure in the cavity.
- **D** Medium pressure on the right side of the valve. No pressure in the cavity.
- **E** Pressure of the medium in the cavity. No pressure on the left and right side of the valve.

DOUBLE ISOLATION AND BLEED - **DIB2**

BROEN BALLOMAX®

A



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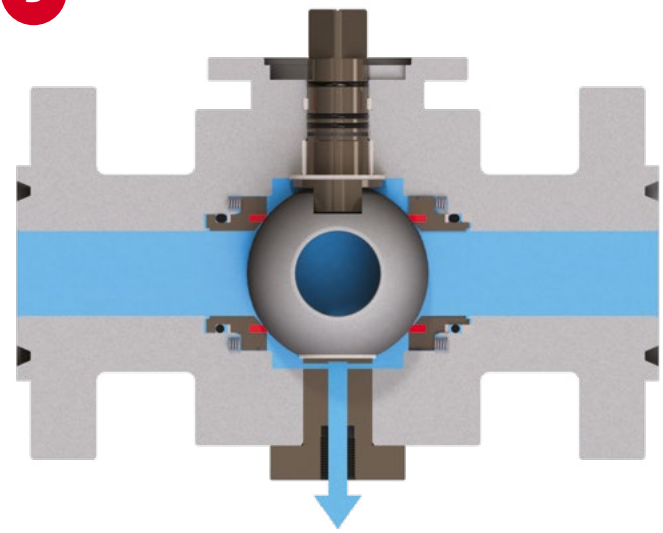

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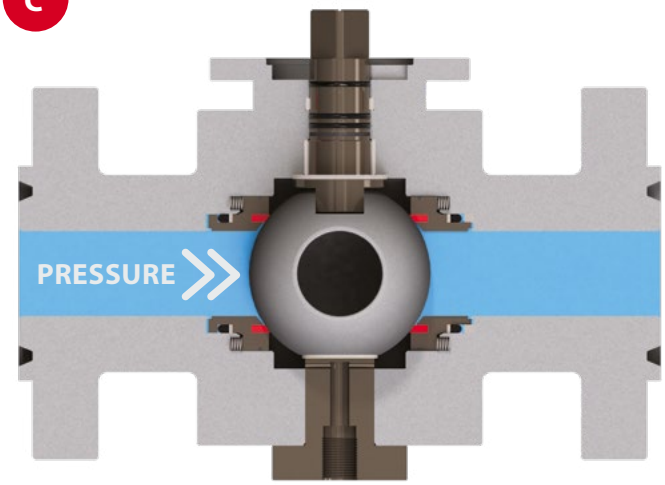

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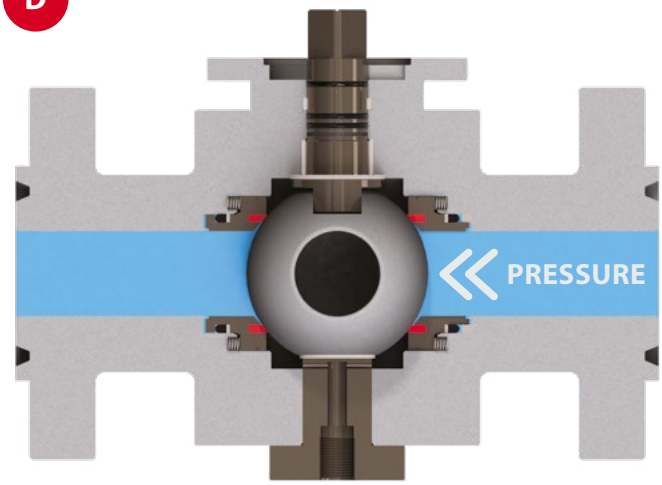

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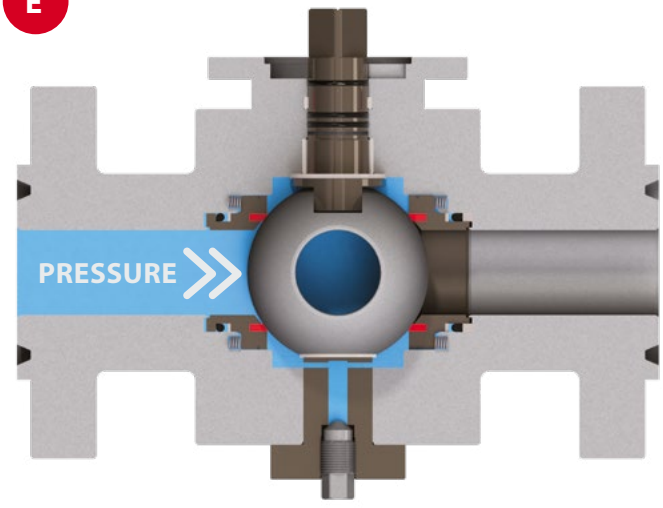


DPE (DIB-2)

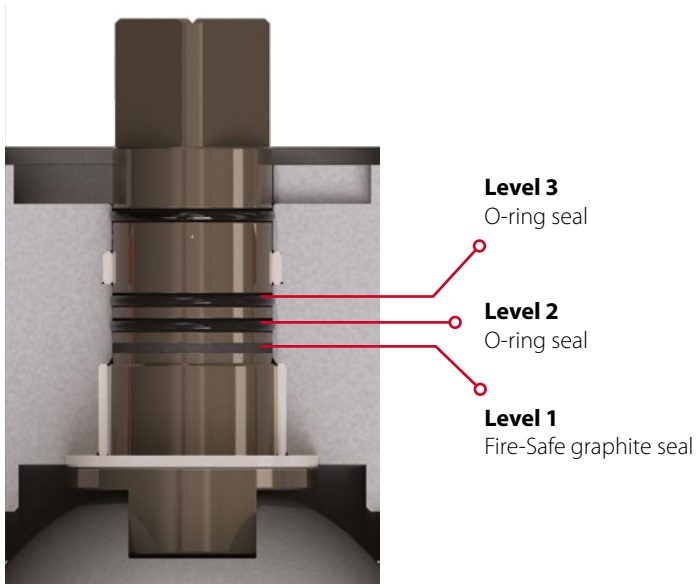
» **IMPORTANT!**

The DIB 2 function ensures valve tightness at a pressure on the left and right side of the valve and when the pressure fills the left side along with the cavity. The left side of the valve is equipped with the SPE function. The right side of the valve is equipped with the DPE function.

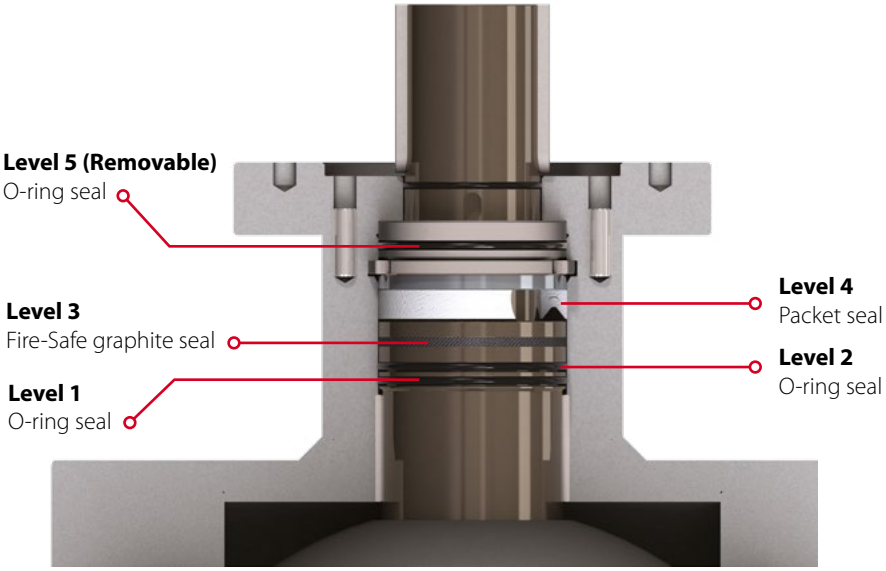
- **A** Both sides of the valve and cavity are filled with the medium.
- **B** Removal of the medium from the cavity.
- **C** Medium pressure on the left side of the valve. No pressure in the cavity.
- **D** Medium pressure on the right side of the valve. No pressure in the cavity.
- **E** Medium pressure in the cavity and on the left side of the valve. No pressure on the right side of the valve.

Depending on the size of valve and the degree of advancement, BROEN BALLOMAX® type AH valve stems are divided into several groups by the number of sealing levels used.
Basic sealing systems are equipped with a minimum of two levels, while the most advanced ones may have as many as five.

Example of stem sealing system with 3 levels



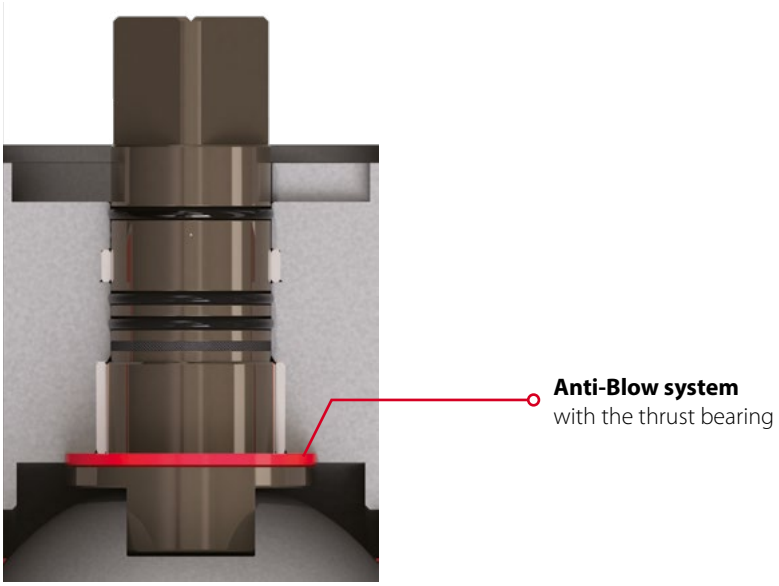
Example of stem sealing system with 5 levels



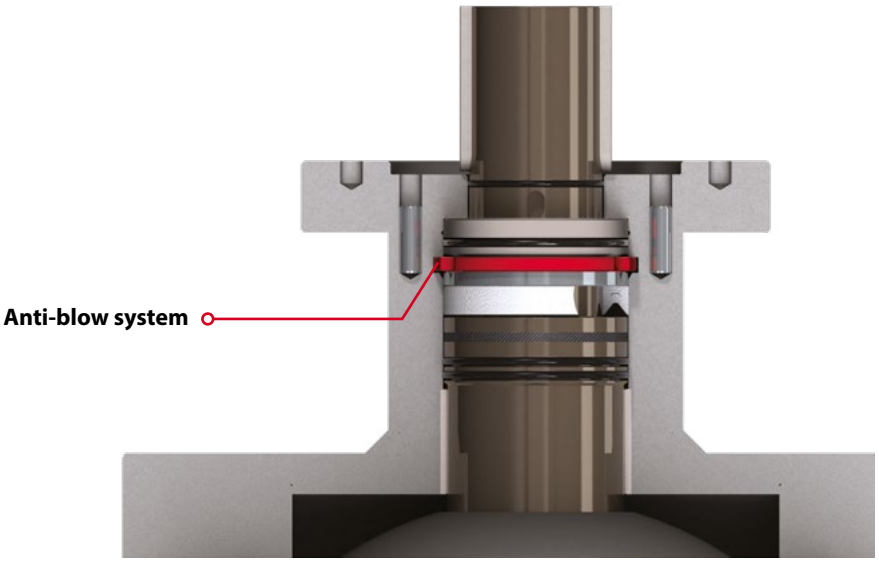
» IMPORTANT!
With Broen 5-level stem sealing system, top level sealing can be replaced without taking valve out of service.

Anti-Blow system prevents the stem from being pushed out of the valve body when the valve is under pressure, for example by removing any external part or by damaging the connection between the closing assembly, even when the external parts are removed. This can be done by the special shape of the stem flange, which under pressure rests on the thrust bearing embedded in the valve body and reduces the torque at the same time. Another example is the use of a split ring that cannot be removed by hand under pressure.

Example of Anti-Blow system for stems mounted from the inside



Example of Anti-Blow system implemented with a special ring that allows for external stem installation



» IMPORTANT!

All BROEN Anti-Blow systems are subjected to a body strength test under a pressure of 1.5xPS (PS - valve maximum allowable pressure).

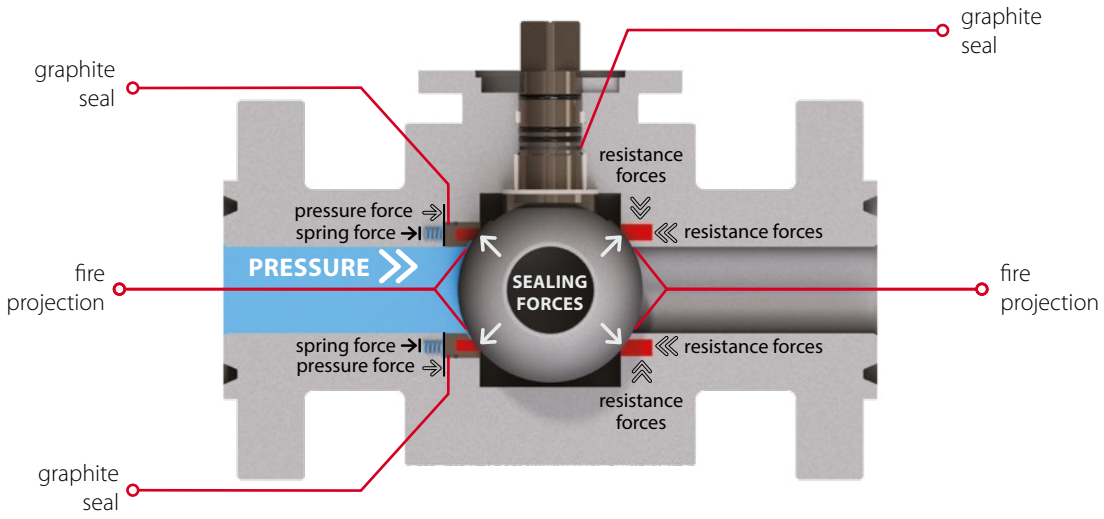
FIRE SAFE SEAL SYSTEM

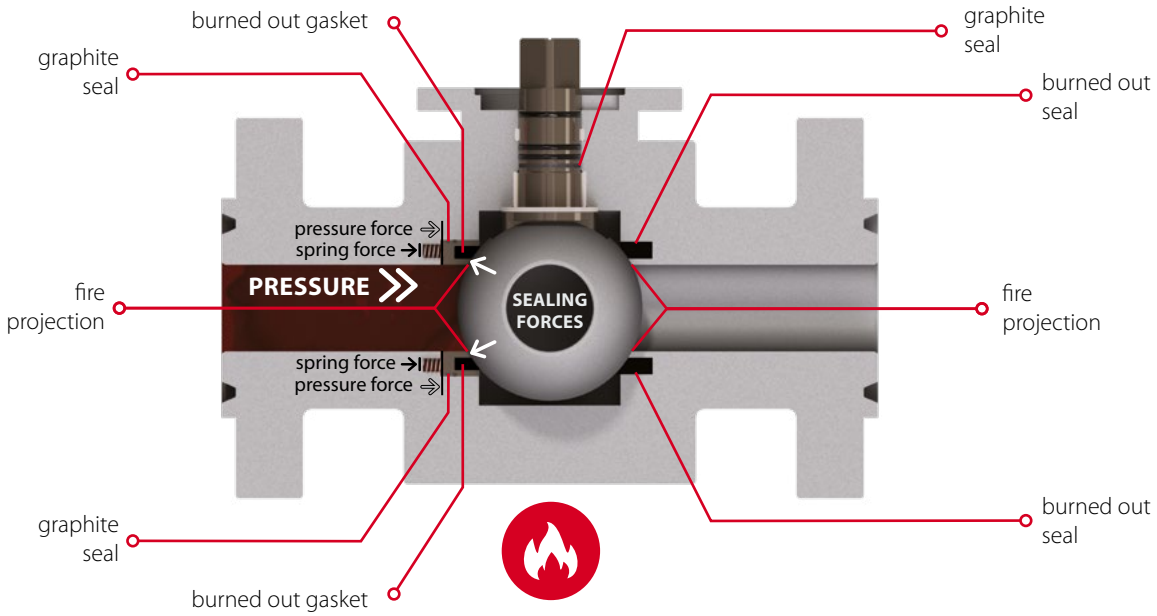
Fire protection constitutes a set of special solutions of sealing elements based on metal and graphite materials, which allows for maintaining the valve tightness during a fire in the installation.

Examples of the use of Fire-Safe protection

Example of a ball with compensation - pressure applied from the side of the seal embedded in the seat.

- A valve operating under normal conditions maintains internal tightness due to contact of the ball with both seals.
- High temperature acting on the valve destroys all seals made of plastic (e.g. elastomers, PTFE, PEEK+C).
- Under the influence of spring forces and the pressure of the medium, the ball with the metal seat on the valve's upstream side moves towards the downstream side, resting on the fire protection of the body, tightly fitted to the ball surface.
- The seat maintains tightness by accurately adjusting its fire projection to the ball and thanks to a graphite gasket.

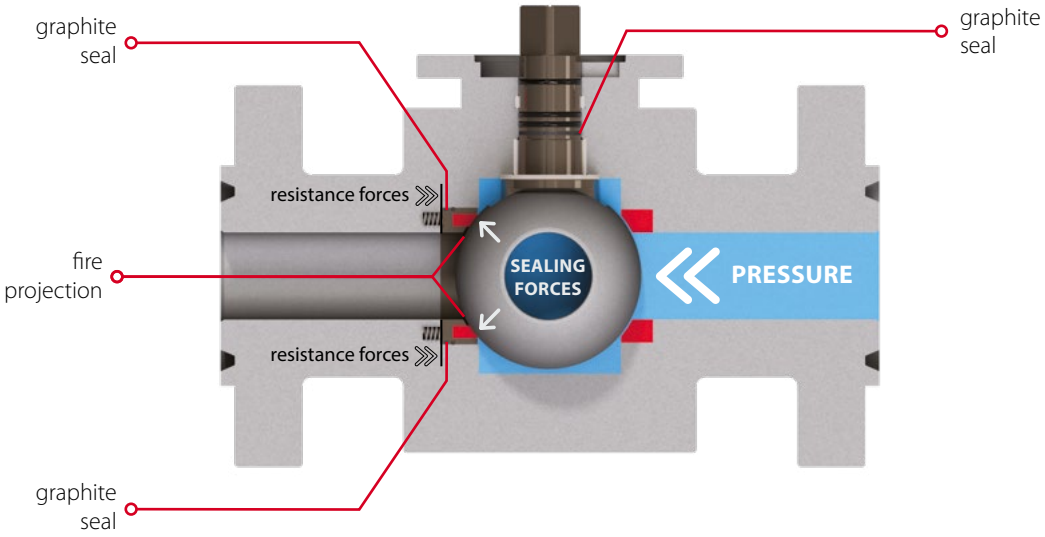


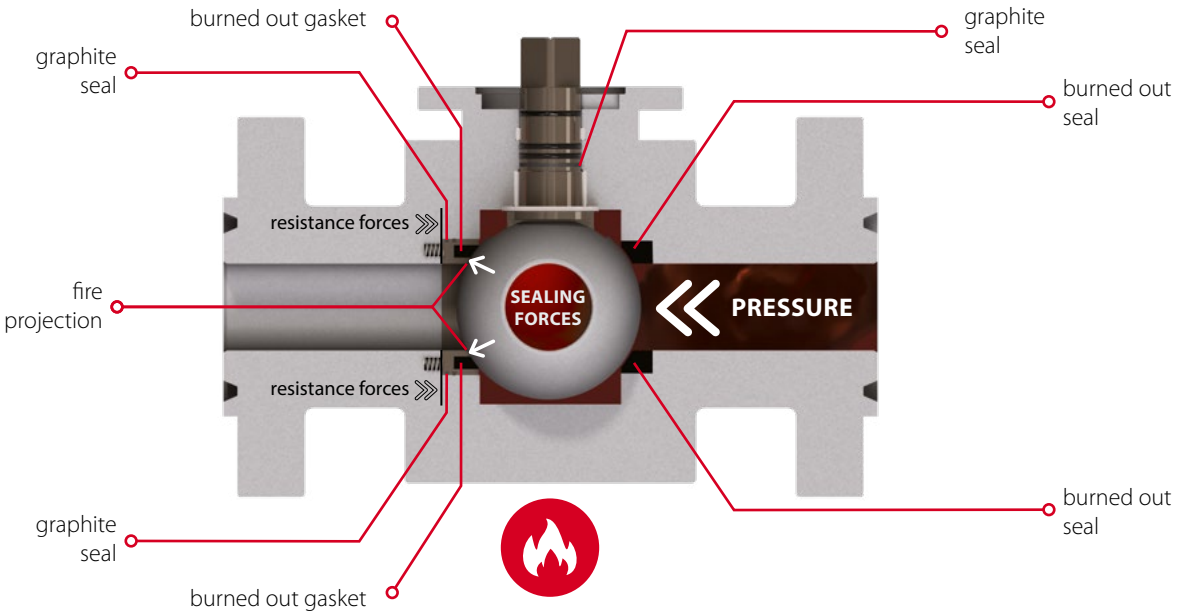


BROEN
VALVE TECHNOLOGIES

Example of a ball with compensation - pressure given from the side of the seal permanently fixed in the valve body

- Depending on the pressure value, one or both seals of the ball maintain tightness.
- High temperature destroys all seals made of plastics.
- The ball, under the influence of the pressure of the medium, moves to the metal seat, creating a metallic contact with the fire projection of the seat.
- Under the pressure from the ball, the seat retracts, compressing the springs and rests on the body, creating a metallic contact.
- Tightness is guaranteed by a precise fit of the metal surfaces and a graphite gasket on the seat.



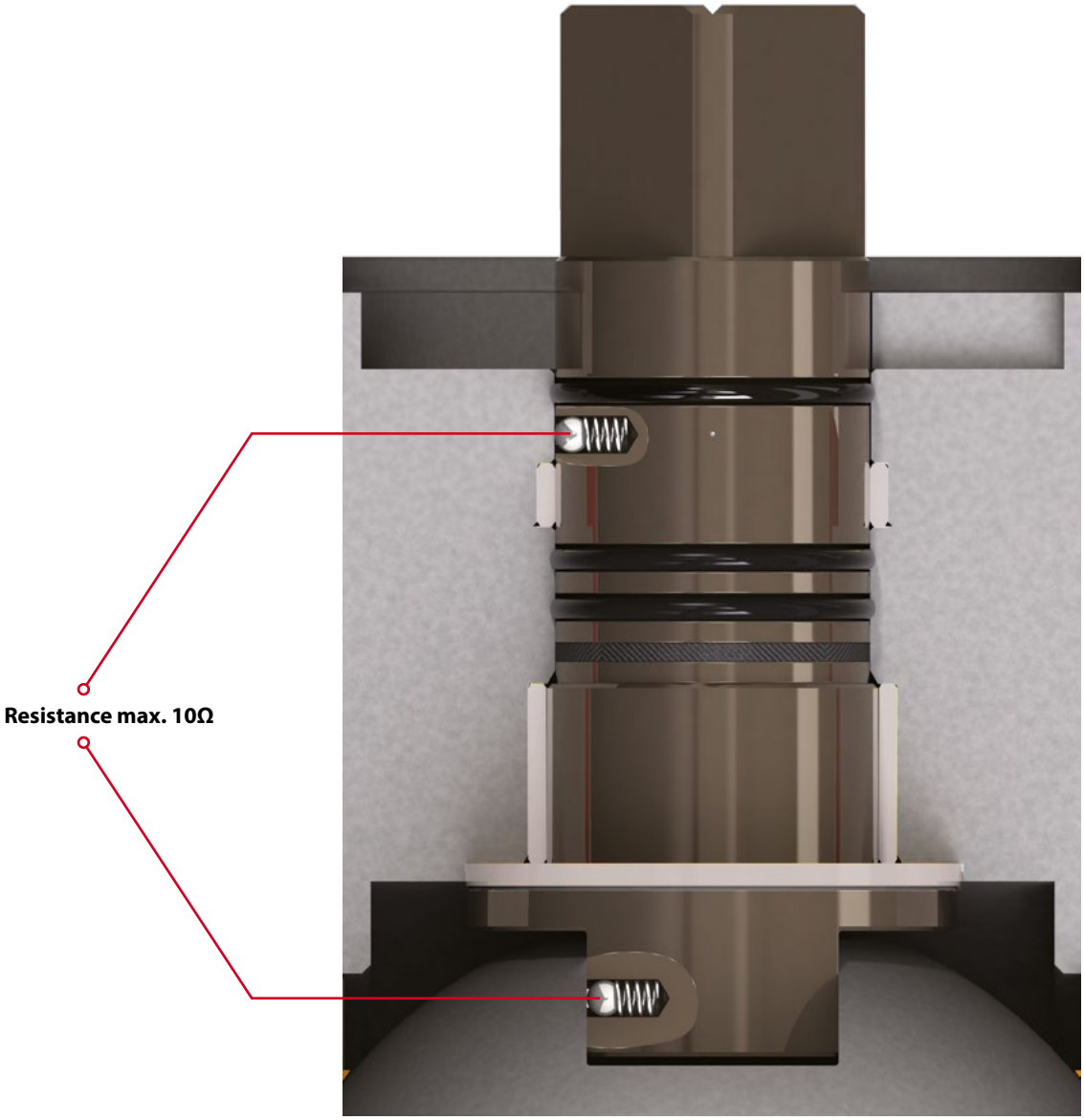


BALL VALVES WITH **ANTISTATIC PROTECTION**

BROEN BALLOMAX®

A metal ball electrically insulated from the valve body with plastic gaskets can become electrically charged as a result of friction of the flowing medium. The metal connection of the ball and the body prevents this phenomenon. Antistatic protection is important especially for liquid and gaseous, flammable and explosive media.

The electrical resistance between the ball and the body is to be tested on the valve assembled prior to the pressure test. It should not exceed 10Ω when using a DC source with a voltage not exceeding 12V.



» IMPORTANT!

All BROEN BALLOMAX® type AH valves have antistatic protection.

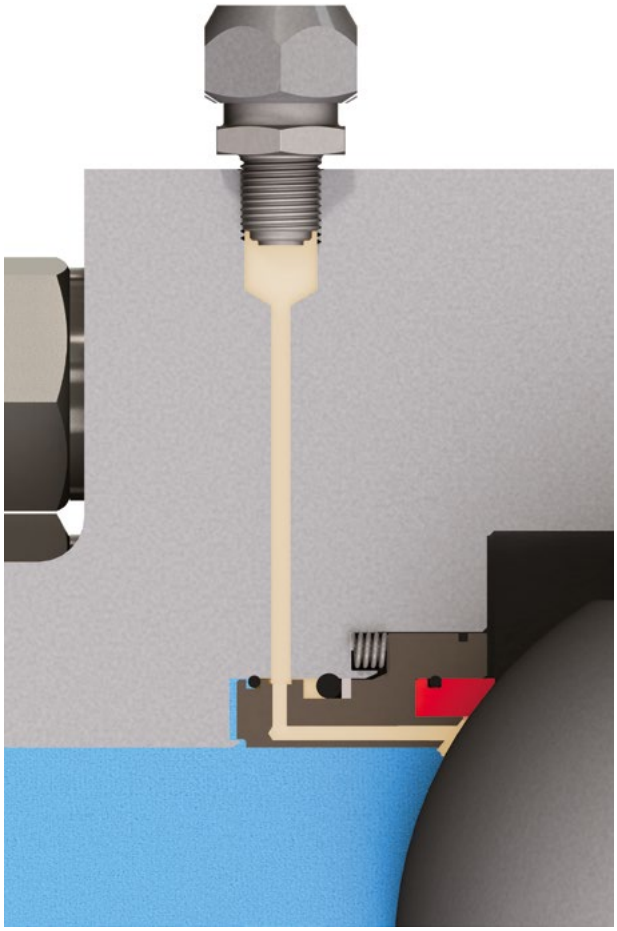
In order to facilitate the operation of the valves, it is possible to lubricate the contact surface of the ball-seal, as well as the stem seal, through a special lubrication system.

During operation, ball valves, as well as all types of closures, are subject to wear, which is reflected by abrasions, scratches or other flaws on seals and balls. Leakage can be reduced by introducing a special sealing grease with high viscosity and high adhesive properties on the contact surface of the ball-seal. Valves for this purpose must have special lubrication systems built into the body.

Valves with a lubrication system show greater resistance to contamination in the pipeline or the working medium thus longer lifetime.

The lubrication system used in the BROEN BALLOMAX® type AH ball valves allows for special operational service consisting in:

- Rinsing-washing the contact surface of the ball-seal,
- Lubricating the surface of the ball, seals and stem,
- Secondary sealing - restoration of the lost tightness in the event of damage to the ball sealing surface, the seal and the stem sealing.

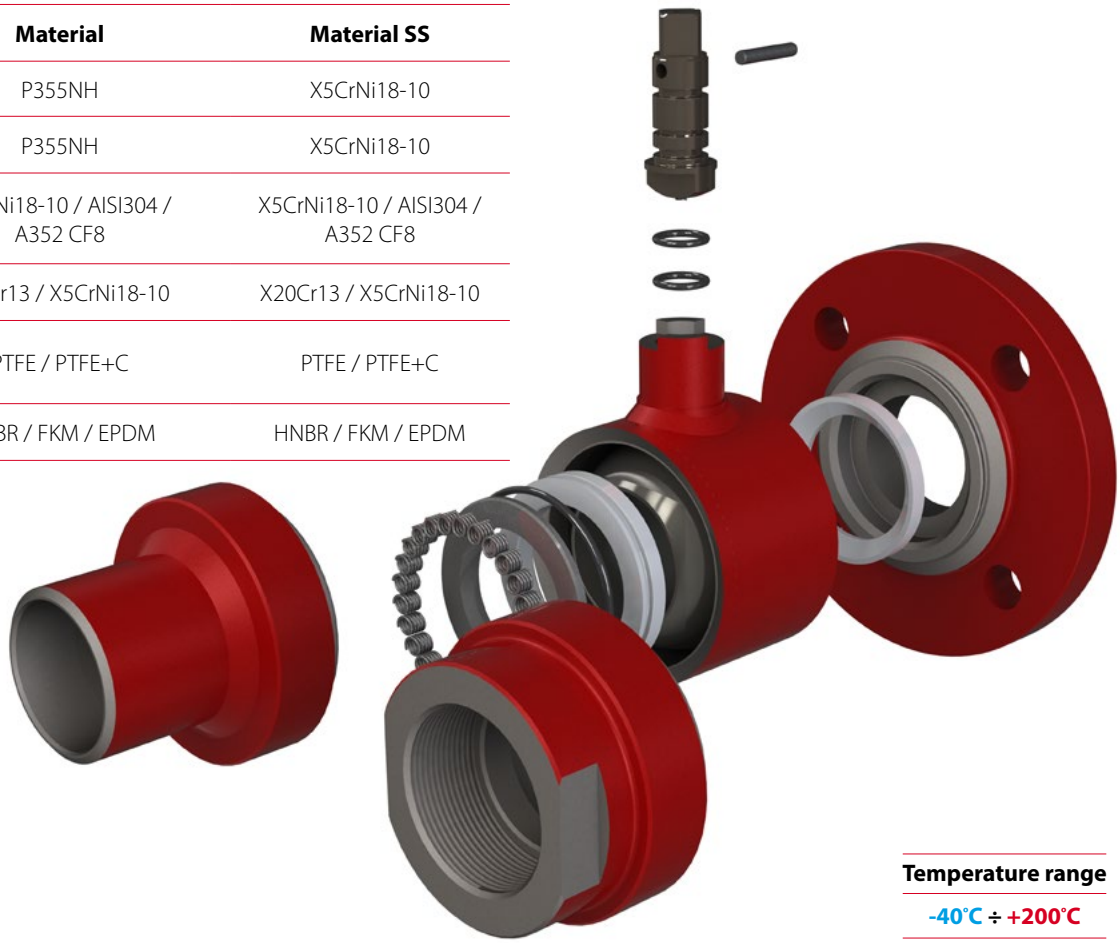


» IMPORTANT!

If there is pressure in the pipeline, it can be used to blow out or rinse out the softened contaminants by the working medium by means of closing and opening the valve.

PN16, PN25, PN40, CL150, CL300

Part name	Material	Material SS
Body	P355NH	X5CrNi18-10
Closure	P355NH	X5CrNi18-10
Ball	X5CrNi18-10 / AISI304 / A352 CF8	X5CrNi18-10 / AISI304 / A352 CF8
Stem	X20Cr13 / X5CrNi18-10	X20Cr13 / X5CrNi18-10
Main sealing	PTFE / PTFE+C	PTFE / PTFE+C
O-ring	HNBR / FKM / EPDM	HNBR / FKM / EPDM



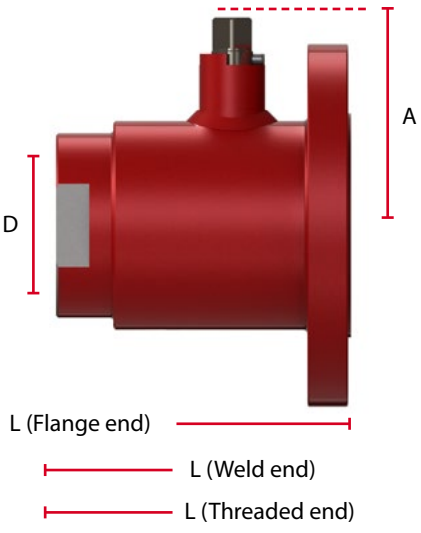
SOFT

SPE

Temperature range

-40°C ÷ +200°C

	PN	CL	D	L (Flange end)	L (Weld end)	L (Threaded end)	A
DN32	16, 25, 40	-	32	104	270	150	83
	-	150		140	178		
		300		178			
DN40	16, 25, 40	-	40	106	190	160	87
	-	150		165			
		300		190			
DN50	16, 25, 40	-	50	108	216	160	95
	-	150		178			
		300		216			
DN65	16, 25, 40	-	64	112	241	210	122
	-	150		190	-		
		300		241			
DN80	16, 25, 40	-	78	140	283	240	131
	-	150		203		-	
		300		283			



PN16, PN25, PN40, CL150, CL300

Part name	Material
Body	P355NH
Closure	P355NH
Ball	S235JR (Ni-Cr)
Stem	X20Cr13 / AISI420
Main sealing	PTFE / PTFE+C
O-ring	HNBR / FKM / EPDM

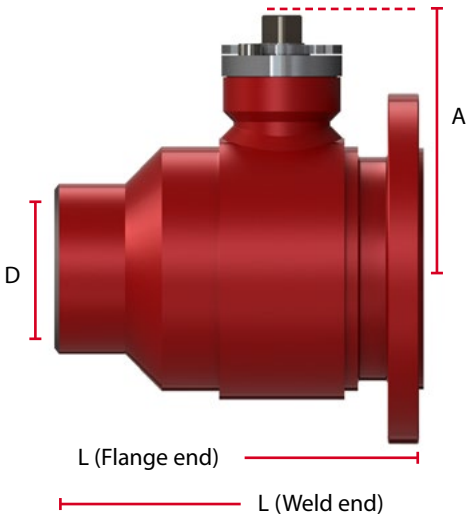
Temperature range

-40°C ÷ +200°C

SOFT

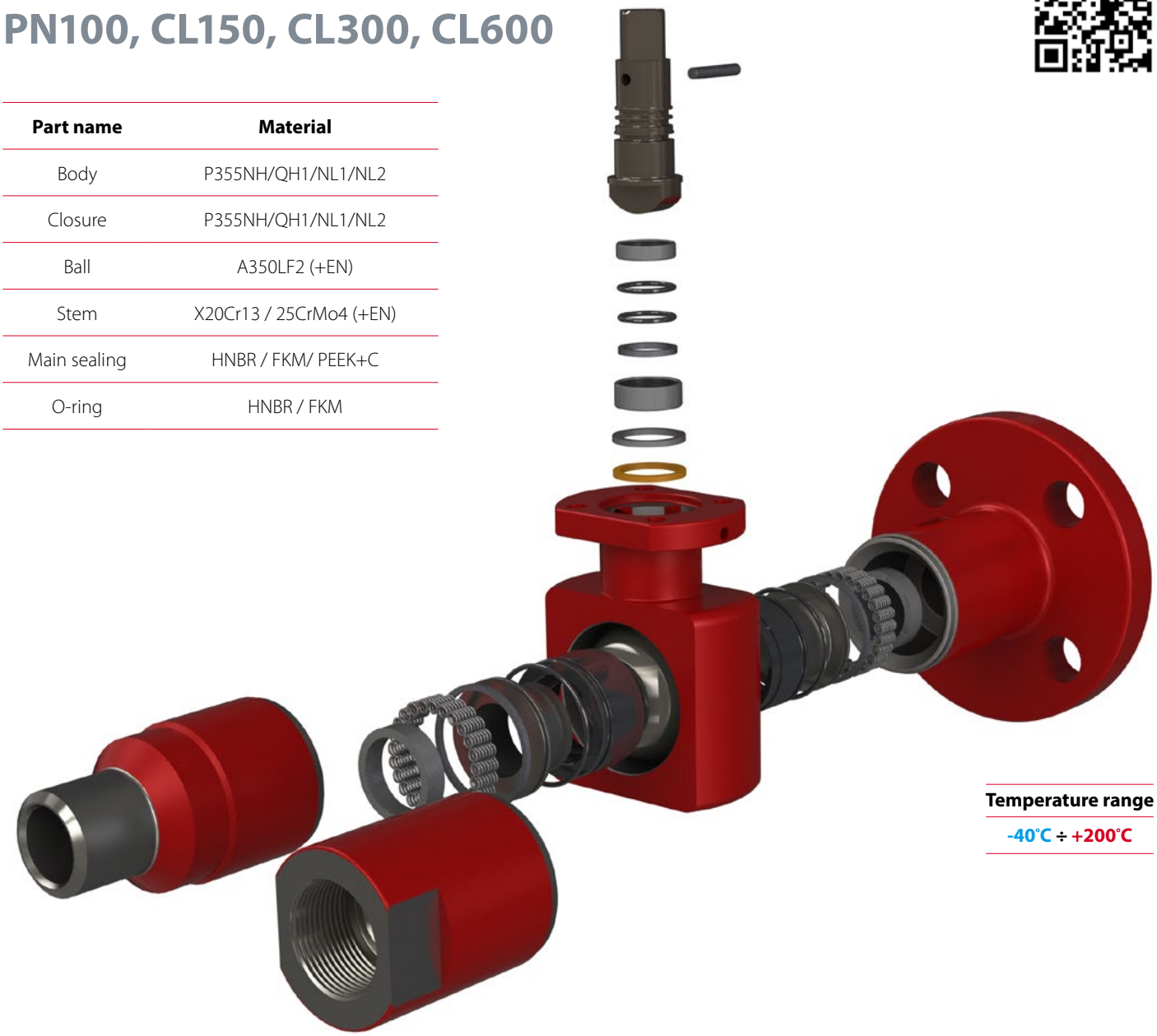
SPE

	PN	CL	D	L (Flange end)	L (Weld end)	A
DN100	16, 25, 40	-	101	190	305	173
	-	150		229		
DN125	16, 25, 40	-	126	325	600	215
DN150	16, 25, 40	-	152	350	457	253
	-	150		394		
		300		403		



PN16, PN25, PN40, PN63, PN100, CL150, CL300, CL600

Part name	Material
Body	P355NH/QH1/NL1/NL2
Closure	P355NH/QH1/NL1/NL2
Ball	A350LF2 (+EN)
Stem	X20Cr13 / 25CrMo4 (+EN)
Main sealing	HNBR / FKM/ PEEK+C
O-ring	HNBR / FKM

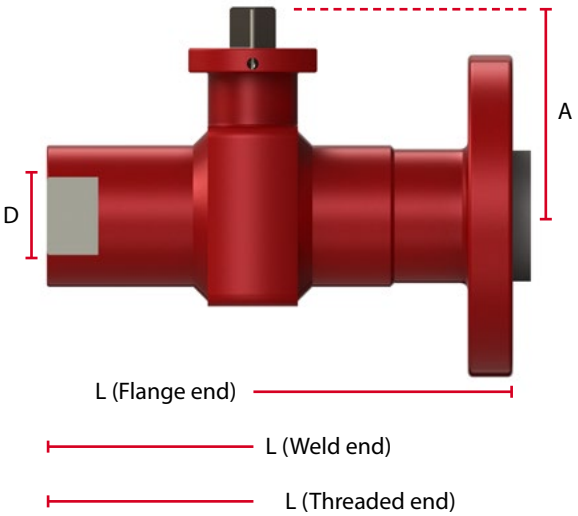


Temperature range

-40°C ÷ +200°C

PMSS SOFT SPE +/-

	PN	CL	D	L (Flange end)	L (Weld end)	L (Threaded end)	A
DN25	16, 25, 40	-	25	160	165	160	80
	-	150		127			
		300		165			
	63, 100	600		216	216		



PN16, PN25, PN40, PN63, PN100, CL150, CL300, CL600

Part name	Material
Body	P355NH/QH1/NL1/NL2
Closure	P355NH/QH1/NL1/NL2
Ball	A350LF2 (+EN)
Stem	X20Cr13 / 25CrMo4 (+EN)
Main sealing	HNBR / FKM/ PEEK+C
O-ring	HNBR / FKM

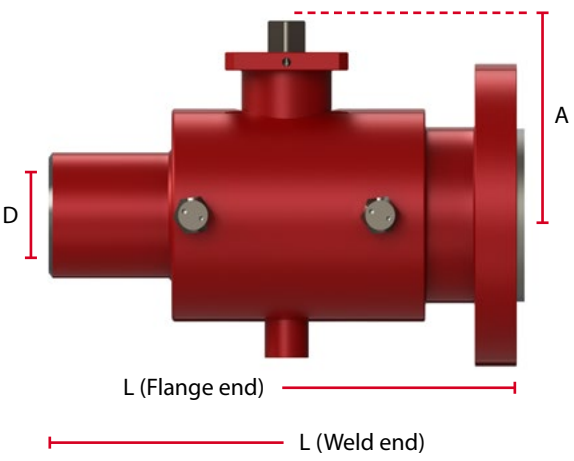
Temperature range

-40°C ÷ +200°C

SOFT | PMSS | M-M | SPE

+/- | DBB | DPE (DIB-1) | DPE (DIB-2)

	PN	CL	D	L (Flange end)	L (Weld end)	A
DN50	16, 25, 40	-	49	230	216	123
	-	150		178		
		300		216		
	63, 100	-		230	292	
	-	600		292		
DN80	16, 25, 40	-	74	310	283	155
	-	150		203		
		300		283		
	63, 100	-		310	356	
	-	600		365		
DN100	16, 25, 40	-	100	300	305	177
	-	150		229		
		300		305		
	63, 100	-		350	432	
	-	600		432		



FULLY WELDED BALL VALVE

PN16, PN25, PN40, PN63, PN100, CL150, CL300, CL600

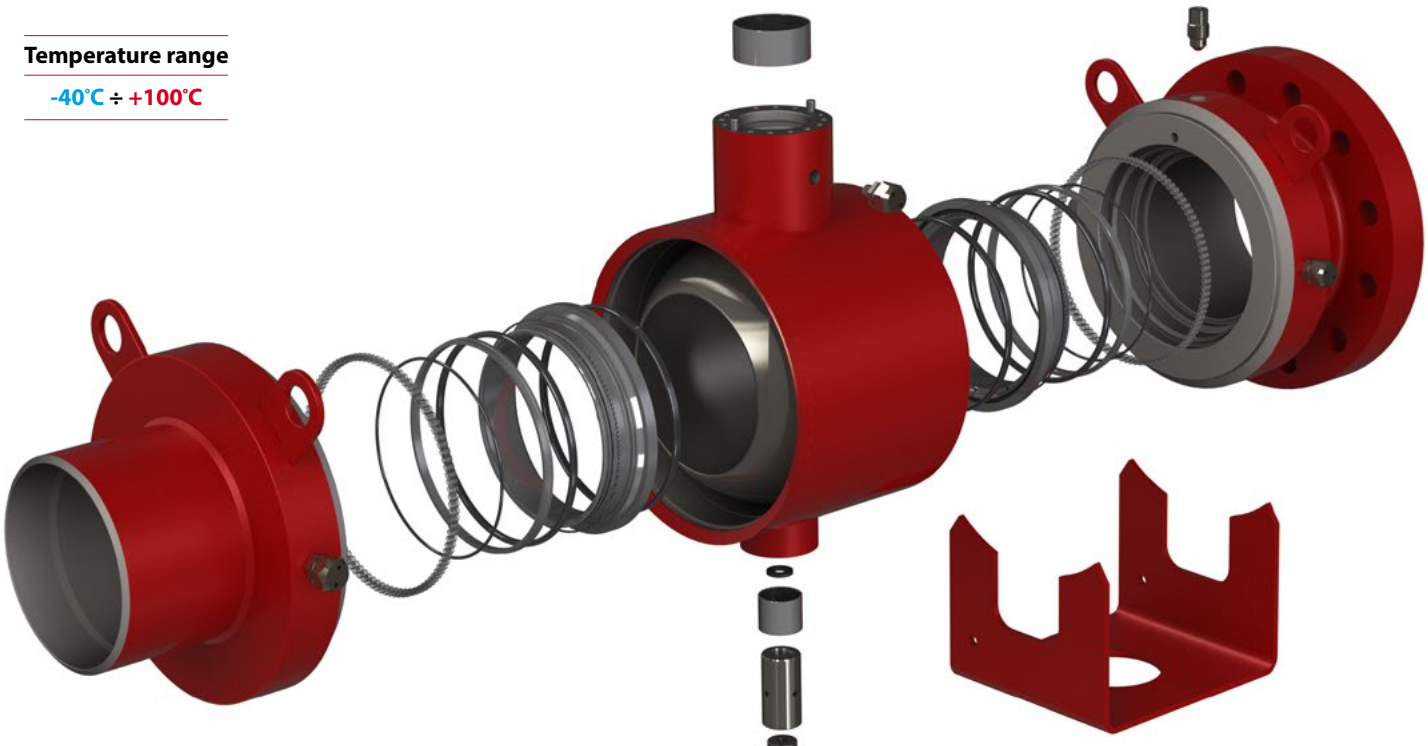
Part name	Material
Body	P355NH/QH1/NL1/NL2
Closure	P355NH/QH1/NL1/NL2
Ball	A350LF2 (+EN)
Stem	X20Cr13 / 25CrMo4 (+EN)
Main sealing	HNBR / FKM/ PEEK+C
O-ring	HNBR / FKM

SOFT | PMSS | M-M | SPE

+/- | DBB | DPE (DIB-1) | DPE (DIB-2) | 🔥

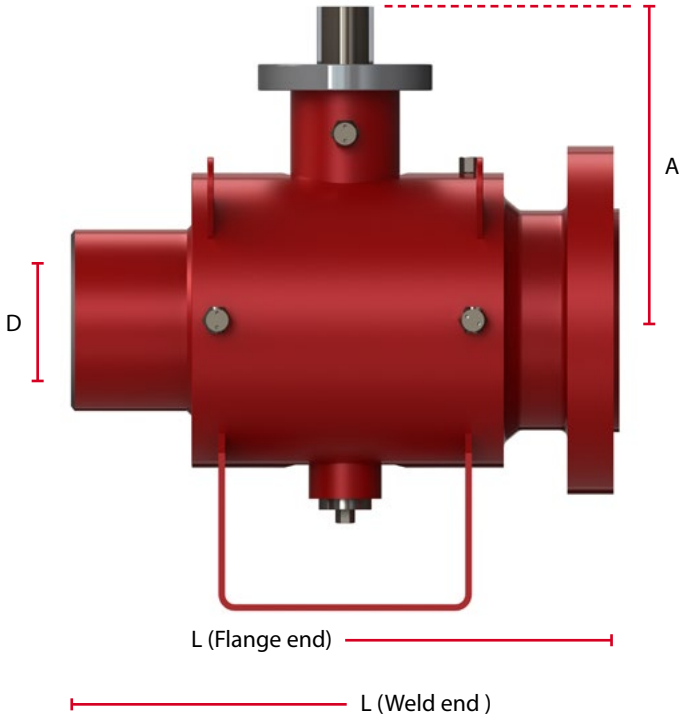
Temperature range

-40°C ÷ +100°C



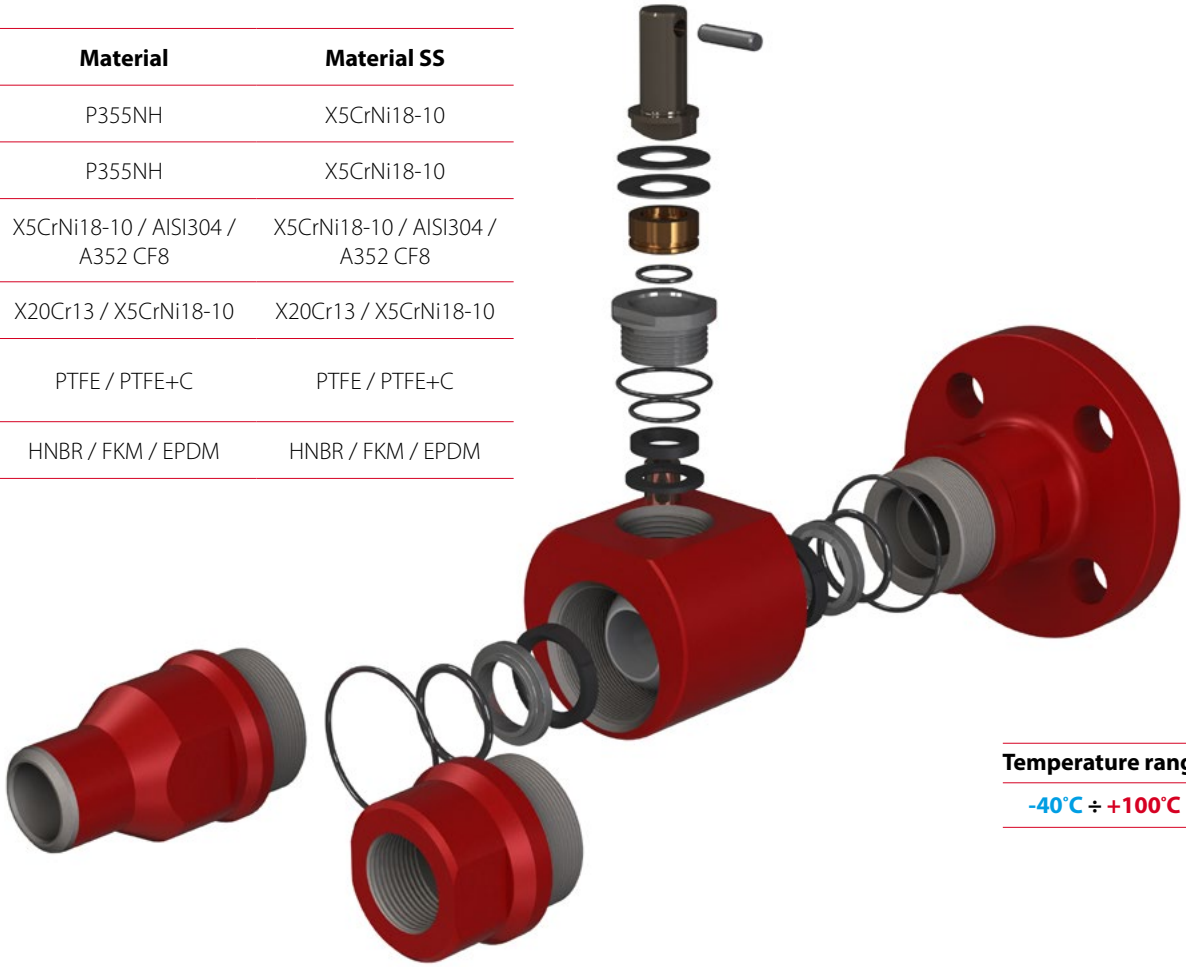
BROEN VALVE TECHNOLOGIES

	PN	CL	D	L (Flange end)	L (Weld end)	A		PN	CL	D	L (Flange end)	L (Weld end)	A
DN150	16, 25, 40	150	150	394	457	260,5	**DN150**	63, 100	-	150	450	559	260,5
	-	300		403				-	600		559		
DN200	16, 25, 40	150	201	457	521	293	**DN200**	63	-	201	597	660	308,5
	-	300		502				100	600		660		
DN250	16, 25, 40	150	252	533	559	342	**DN250**	63	-	252	673	787	380,5
	-	300		568				100	600		787		
DN300	16, 25, 40	150	303	610	635	413,5	**DN300**	63	-	303	762	838	415
	-	300		648				100	600		838		
DN350	16, 25, 40	150	334	686	762	430,5	**DN350**	63	-	334	826	889	465,5
	-	300		762				100	600		889		
DN400	16, 25, 40	150	385	762	838	469	**DN400**	63	-	385	902	991	504
	-	300		838				-	600		991		
DN500	16, 25, 40	150	487	914	991	577	**DN500**	-	600	487	991	1194	610
	-	300		991									
DN600	16, 25, 40	150	589	1067	1143	680	**DN600**	-	600	589		1397	722
	-	300		1143									
DN700	16, 25, 40	150	684	1245	1346	750	**DN700**	-	600	684	1549	1549	795,5
	-	300		1346									



PN16, PN25, PN40, CL150, CL300, PN63, PN100, CL600

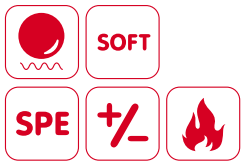
Part name	Material	Material SS
Body	P355NH	X5CrNi18-10
Closure	P355NH	X5CrNi18-10
Ball	X5CrNi18-10 / AISI304 / A352 CF8	X5CrNi18-10 / AISI304 / A352 CF8
Stem	X20Cr13 / X5CrNi18-10	X20Cr13 / X5CrNi18-10
Main sealing	PTFE / PTFE+C	PTFE / PTFE+C
O-ring	HNBR / FKM / EPDM	HNBR / FKM / EPDM

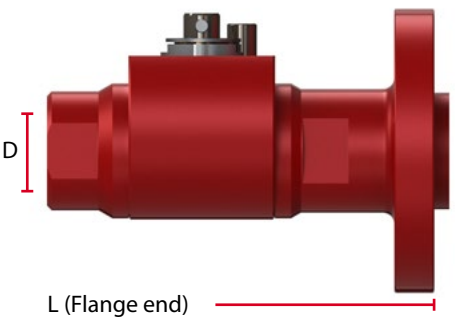


Temperature range

-40°C ÷ +100°C

	PN	CL	D	L (Flange end)	L (Weld end)	L (Threaded end)
DN15	16, 25, 40	-	15	130	130	100
	-	150		108	140	
		300		140		
	63, 100	-		130	165	
	-	600		165		
DN20	16, 25, 40	-	20	150	150	110
	-	150		117	152	
		300		152		
	63, 100	-		150	190	
	-	600		190		
DN25	16, 25, 40	-	25	160	160	135
	-	150		127	165	
		300		165		
	63, 100	-		160	216	
	-	600		216		

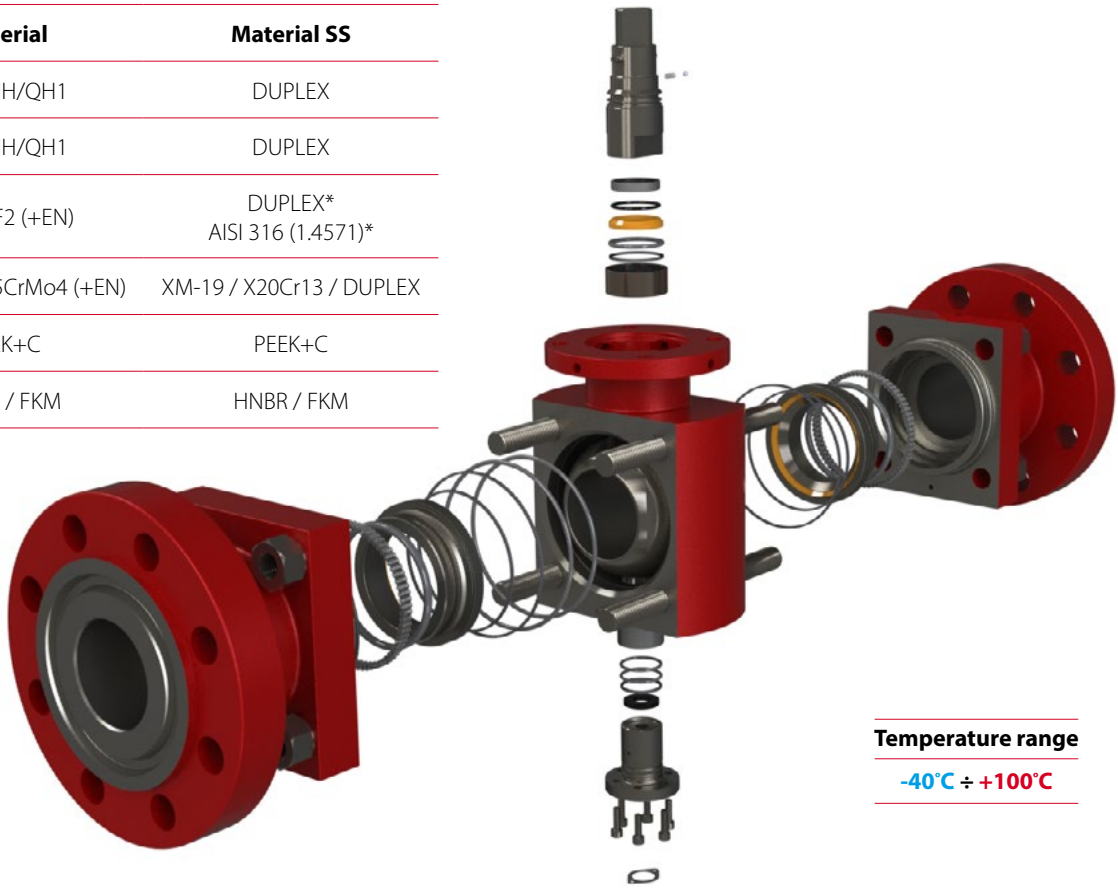




PN16, PN25, PN40, PN63, PN100, PN160, CL150, CL300, CL600, CL900

Part name	Material	Material SS
Body	P355NH/QH1	DUPLEX
Closure	P355NH/QH1	DUPLEX
Ball	A350LF2 (+EN)	DUPLEX* AISI 316 (1.4571)*
Stem	X20Cr13 / 25CrMo4 (+EN)	XM-19 / X20Cr13 / DUPLEX
Main sealing	PEEK+C	PEEK+C
O-ring	HNBR / FKM	HNBR / FKM

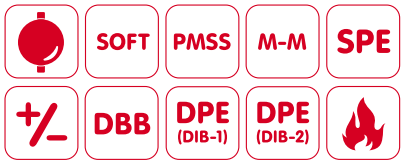
* NBA coating / TC coating

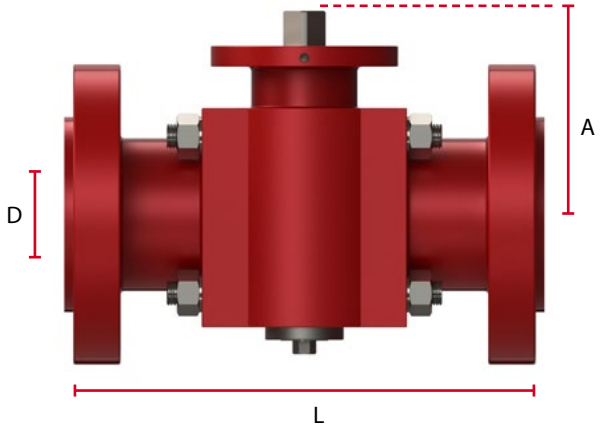


Temperature range

-40°C ÷ +100°C

	PN	CL	D	L (Flange end)	A
DN50	16, 25, 40	-	49	230	123
	-	150		170	
		300		216	
	63, 100	-		230	
	-	600		292	
	160	900		368	139
DN80	16, 25, 40	-	74	310	155
	-	150		203	
	-	300		283	
	63, 100	-		310	
	-	600		365	
	160	900		381	163
DN100	16, 25, 40	-	100	300	177
	-	150		229	
	-	300		305	
	63, 100	-		350	
	-	600		432	
	160	900		457	216

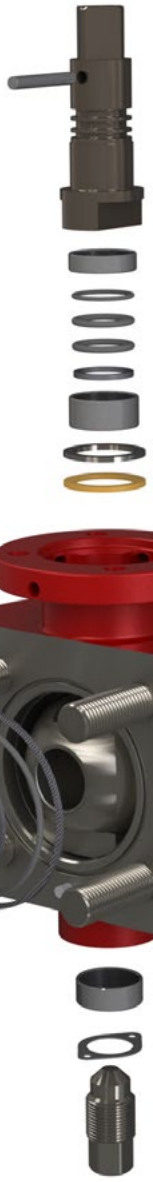


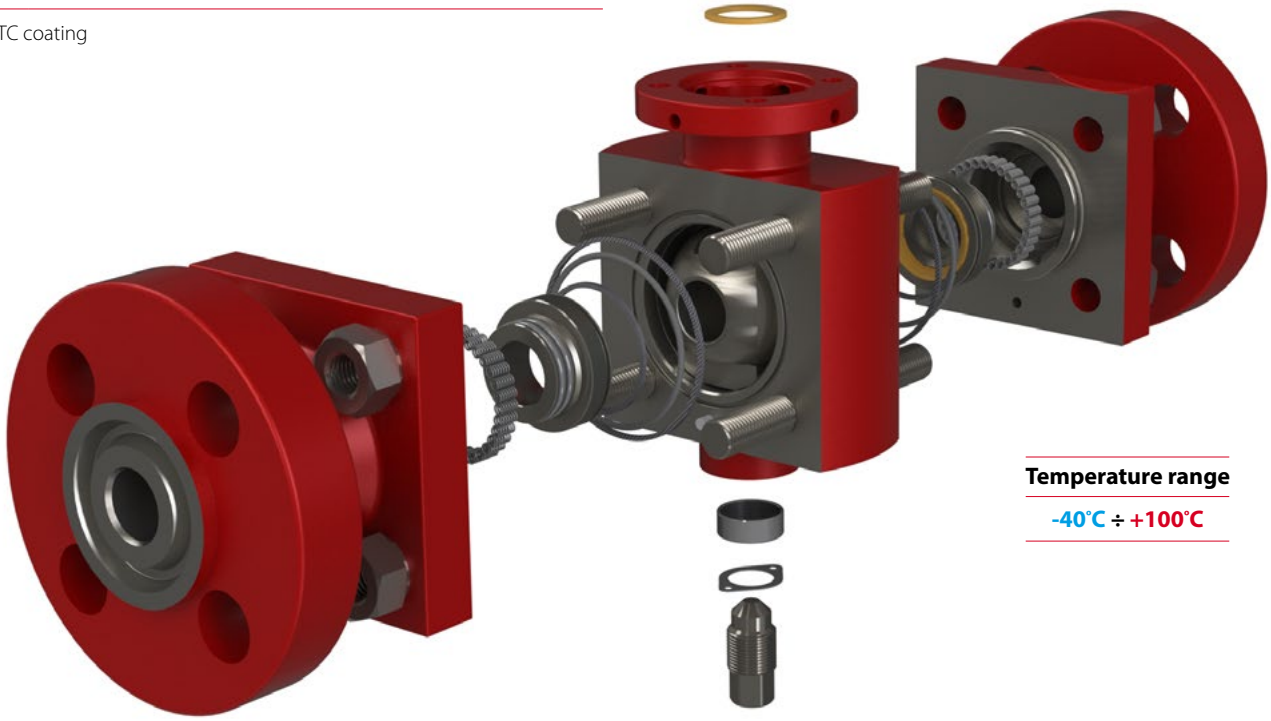


PN160, PN250, PN320, PN400, CL900, CL1500, CL2500

Part name	Material	Material SS
Body	P355NH/QH1	DUPLEX
Closure	P355NH/QH1	DUPLEX
Ball	A350LF2 (+EN)	DUPLEX* AISI 316 (1.4571)*
Stem	X20Cr13 / 25CrMo4 (+EN)	XM-19 / X20Cr13 / DUPLEX
Main sealing	PEEK+C	PEEK+C
O-ring	HNBR / FKM	HNBR / FKM

* NBA coating / TC coating





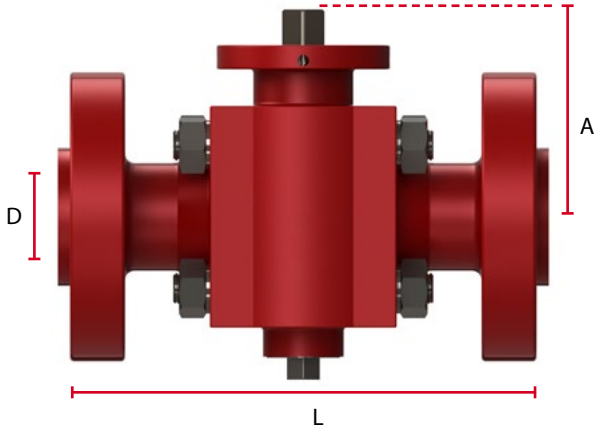
Temperature range

-40°C ÷ +100°C

SOFT PMSS M-M

SPE +/- DBB

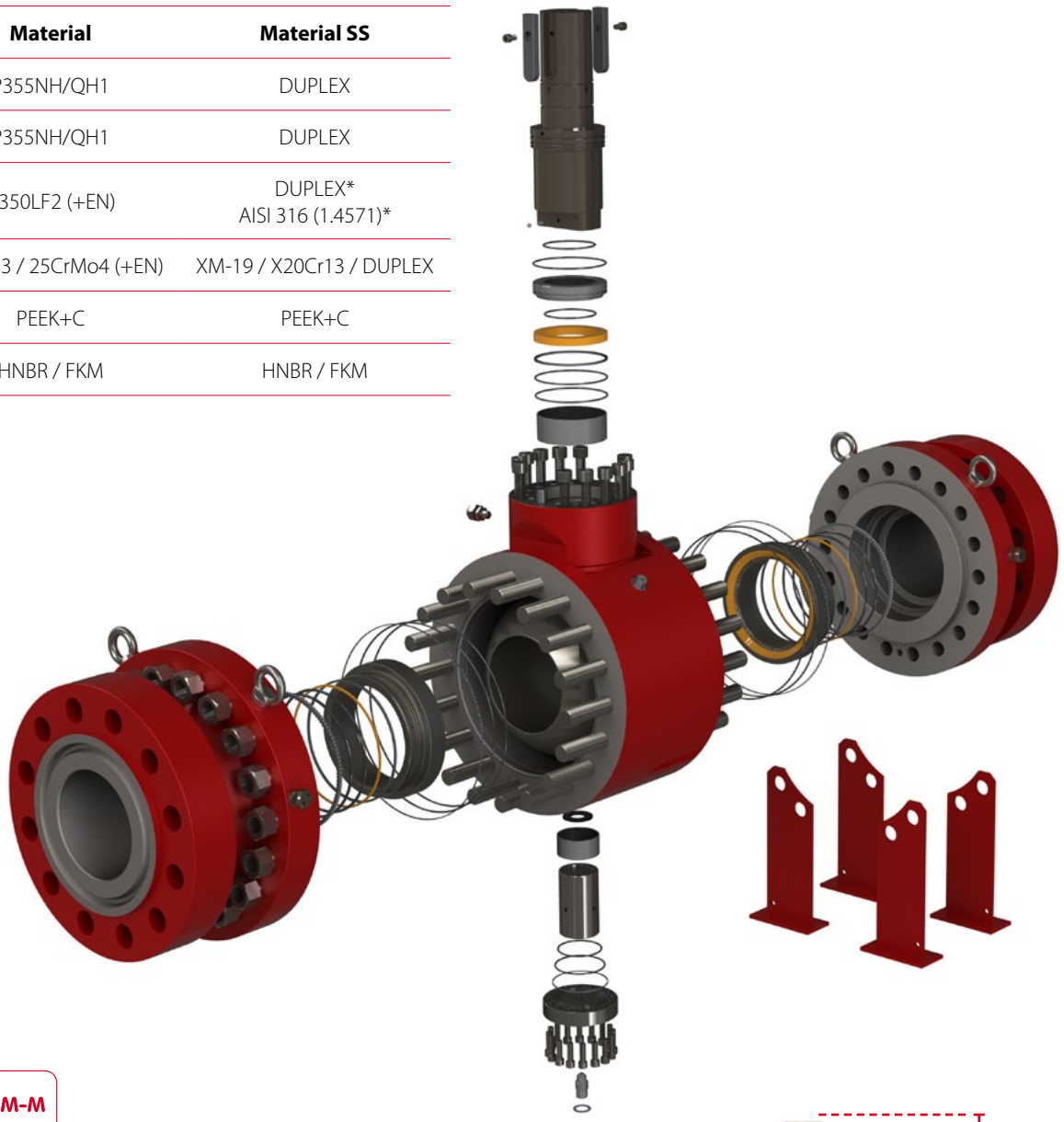
	PN	CL	D	L	A
DN25	160, 250	900, 1500	25	254	89
	320, 400	2500		308	



PN250, PN320, PN400, CL1500, CL2500

Part name	Material	Material SS
Body	P355NH/QH1	DUPLEX
Closure	P355NH/QH1	DUPLEX
Ball	A350LF2 (+EN)	DUPLEX* AISI 316 (1.4571)*
Stem	X20Cr13 / 25CrMo4 (+EN)	XM-19 / X20Cr13 / DUPLEX
Main sealing	PEEK+C	PEEK+C
O-ring	HNBR / FKM	HNBR / FKM

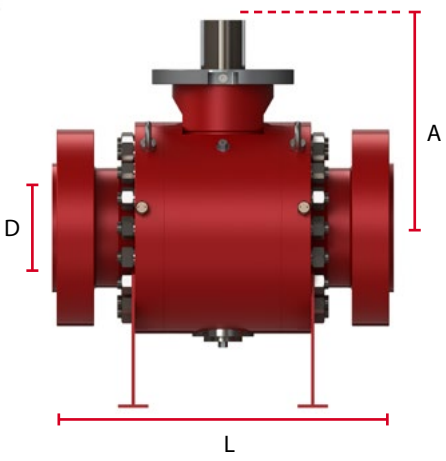
* NBA coating / TC coating



Temperature range

-40°C ÷ +100°C

SOFT | PMSS | M-M | SPE | +/- | DBB

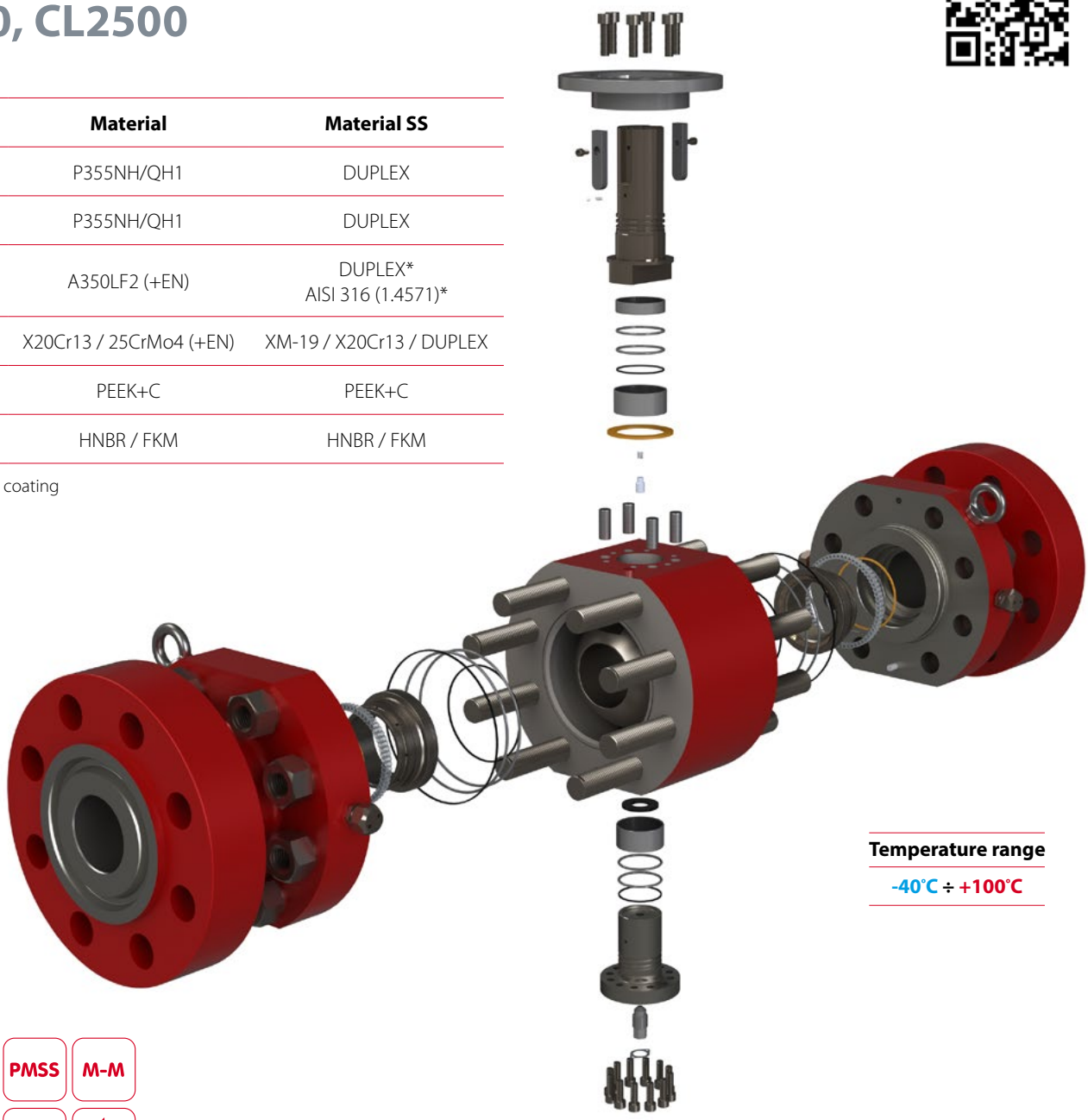


	PN	CL	D	L (Flange end)	A
DN150	250	1500	144	711	423
	320, 400	2500	131	927	x
DN200	250	1500	192	841	512
	320, 400	2500	179	1038	x

PN250, PN320, PN400, CL1500, CL2500

Part name	Material	Material SS
Body	P355NH/QH1	DUPLEX
Closure	P355NH/QH1	DUPLEX
Ball	A350LF2 (+EN)	DUPLEX* AISI 316 (1.4571)*
Stem	X20Cr13 / 25CrMo4 (+EN)	XM-19 / X20Cr13 / DUPLEX
Main sealing	PEEK+C	PEEK+C
O-ring	HNBR / FKM	HNBR / FKM

* NBA coating / TC coating



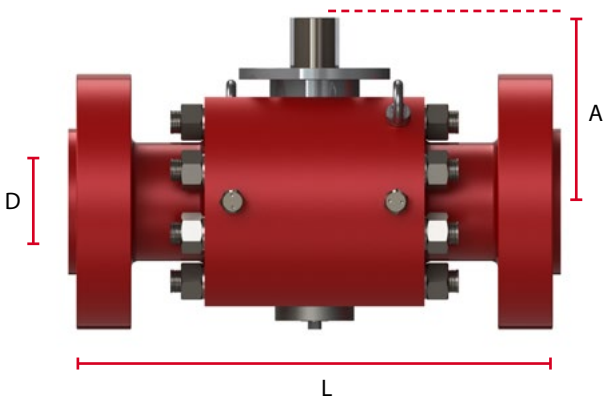
Temperature range

-40°C ÷ +100°C

SOFT PMSS M-M

SPE +/- DBB

	PN	CL	D	L	A
DN50	250	1500	49	368	151,5
	320, 400	2500	42	451	
DN80	250	1500	74	470	205,5
	320, 400	2500	62	578	
DN100	250	1500	100	546	221,5
	320, 400	2500	87	673	255,5



PROPERTIES OF GASKETS USED BY BROEN POLAND

MATERIAL	PROPERTIES
PTFE (Polytetrafluoroethylene)	• Chemical resistance to almost all substances, • Working temperature range: -200°C ÷ +260°C, • No water absorption, • Environmental aging resistance, • Low coefficient of friction and wear, • Physiological harmlessness, • Excellent dielectric properties.
PTFE+C (Polytetrafluoroethylene + carbon filler)	• Thanks to the use of carbon filler, the properties of PTFE are improved: - Mechanical strength increases, - The coefficient of thermal expansion decreases, - Abrasion is reduced.
PEEK+C (Polyetheretherketone + carbon filler)	• Chemical resistance to almost all substances, • Working temperature range: -70°C ÷ +260°C, • Low coefficient of friction, • Environmental aging resistance, • Low wear factor, • High mechanical strength, • High strength-to-weight ratio, • Low water absorption, • Creep resistance of the material.
HNBR (Nitrile butadiene rubber)	• Working temperature range: -55°C ÷ +160°C, • Resistant, among others for mineral oils and greases, diluted acids, glycol mixtures, acid gas, hydrogen sulphide, • Not resistant to water, synthetic oils and silicone lubricants.
FKM (Fluorine rubber)	• Working temperature range: -60°C ÷ +250°C, • Resistant to mineral oils and greases, fuels, amines, dilute salt solutions, alcohols, oxygen, ozone, acid gas, hydrogen sulphide, • Not resistant to concentrated organic acids, acetone and water vapor.
FFKM (Perfluorinated rubber)	• Working temperature range: -40°C ÷ +320°C, • Resistant to acids, chemicals, hot water, steam, solvents, oils, greases, amines, acid gas, hydrogen sulphide, • Vulnerable to chemical substances containing fluorine.
EPDM (ethylene propylene diene monomer)	• Working temperature range: -40°C ÷ +150°C, • Resistant to hot water and steam, organic and inorganic acids, potassium and sodium bases, silicone-based oils and greases, polar solvents, • Not resistant to aliphatic and aromatic hydrocarbons, products based on mineral oils (greases, oils, fuels).
TFE (Tetrafluoroethylene propylene copolymer)	• Working temperature range: -10°C ÷ +200°C, • Resistant to hot steam, corrosion inhibitors, greases, oils, industrial solvents, ammonia, hydrogen sulphide.

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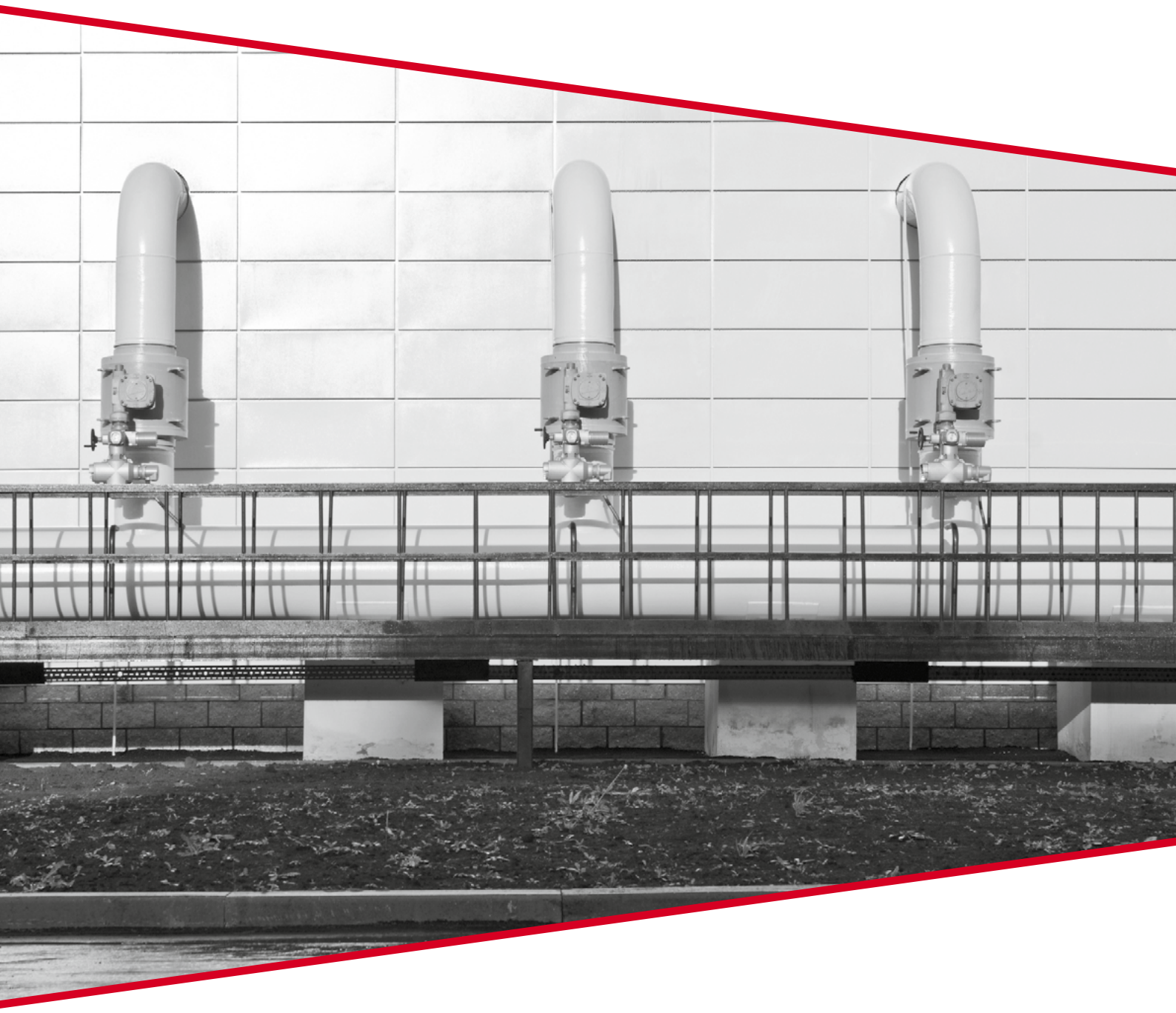
BROEN
VALVE TECHNOLOGIES

ACCESSORIES



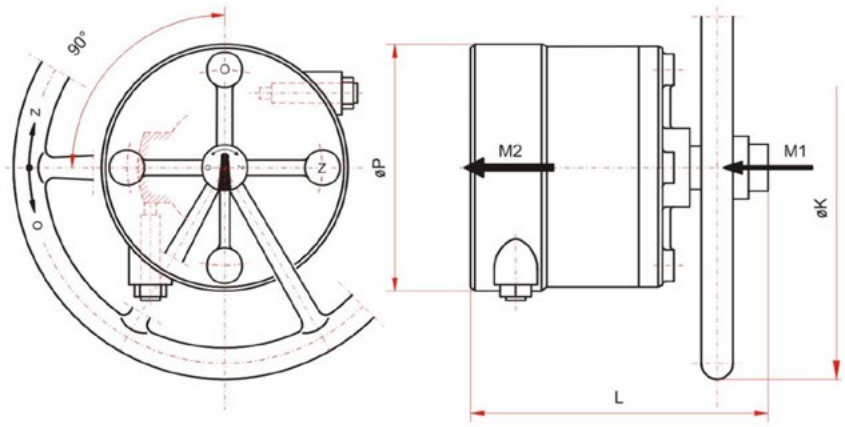
BROEN BALLOMAX®

Designed to last

PO-27

The PO-27 gear is a non self-locking two-stage planetary gear, featuring cylindrical gears, lubricated with grease and bearing on sleeves with Teflon surfaces, ensuring high mechanical efficiency.

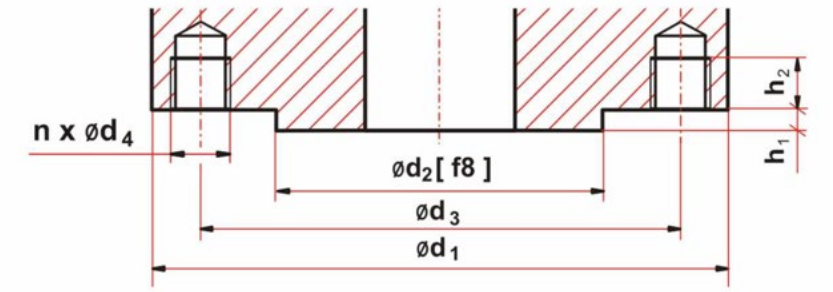
The gears are adapted to work with valves equipped with connection flanges according to ISO 5211, with a stem end compatible with gear socket specified in the table.
A nameplate indicating basic technical data is placed on each gear unit.



Technical data - basic dimensions of the gear type

Gear type	Gear ratio	M_1	M_2	$t_{amb.}$	L	øK	øP	Max. manual force on wheel	Flange acc. to ISO5211	Socket diameter and depth	weight
		Nm	Nm	°C	mm	mm	mm	N		mm x mm	kg
PO-27/100	1:27	100	2000	-40 ÷ +150	-200	450	170	460	F12 F14	Ø22x35 or Ø27x40 or Ø36x50	18,0
PO-27/200	1:27	200	4000	-40 ÷ +150	-270	650	220	660	F14 F16	Ø36x60 or Ø60x80 with 18x11 stem	37,3
PO-27/300	1:27	290	6000	-40 ÷ +150	-310	800	300	720	F25	Ø72x 110 with 20x12 stem	54,5

Dimensions of the flange connections on the gear according to ISO 5211



Flange acc. to ISO 5211	Dimensions [mm]						Number of bolts n [pcs.]	Torque MOBR (max) [Nm]
	ød1	ød2	ød3	ød4	h1	h2		
F12	150	85	125	M12	3	18	4	1000
F14	175	100	140	M16	4	20	4	2000
F16	210	130	165	M20	5	30	4	4000
F25	300	200	254	M16	5	30	8	8000

PO-27 gear
wheel-controlled

PO-27 gear
T-key controlled

PO-27 gear
with transport handle

KS STEM EXTENSIONS

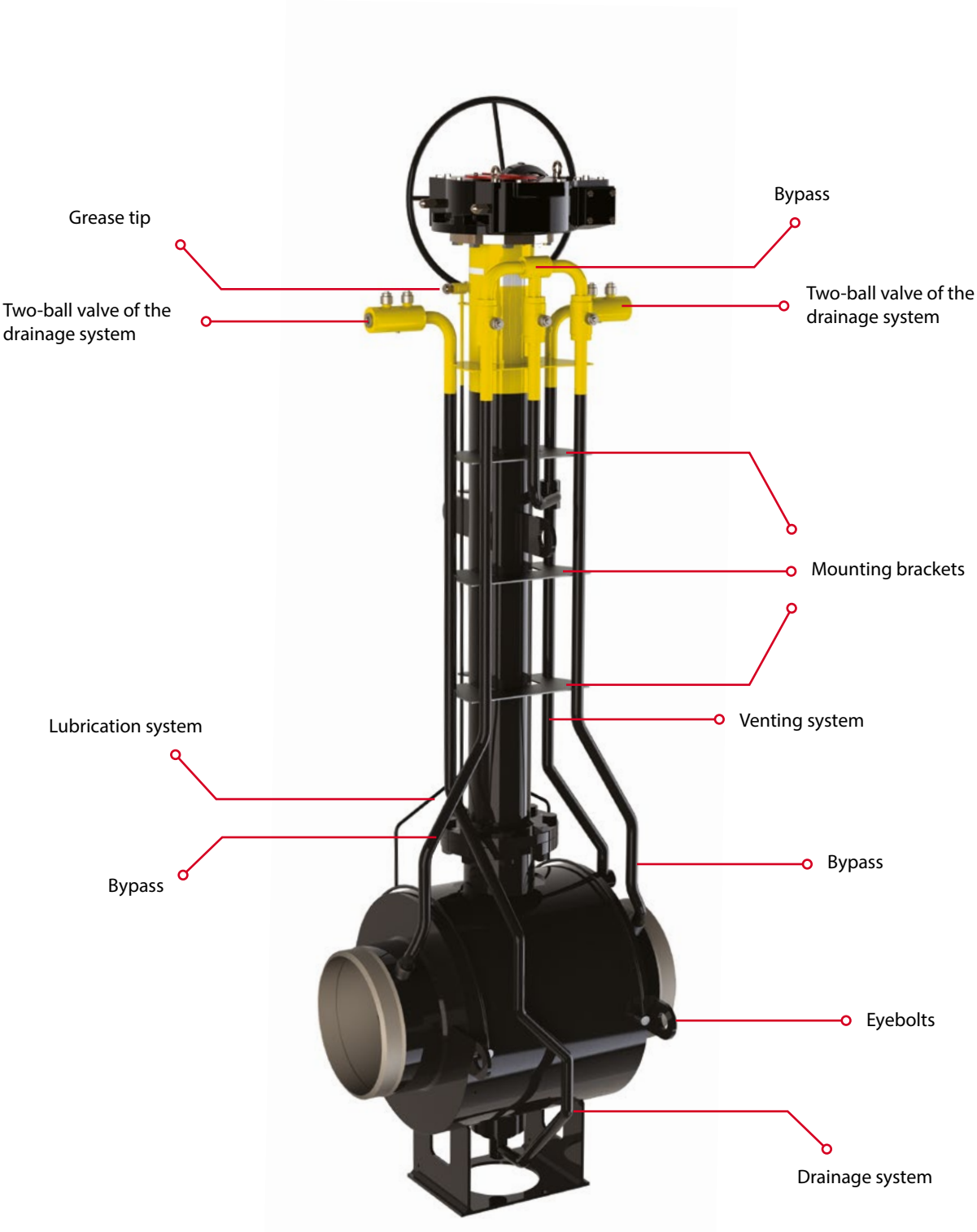
The stem extensions are manufactured in standard BROEN dimensions or according to customer needs.

Column types:

- fixed
- adjustable

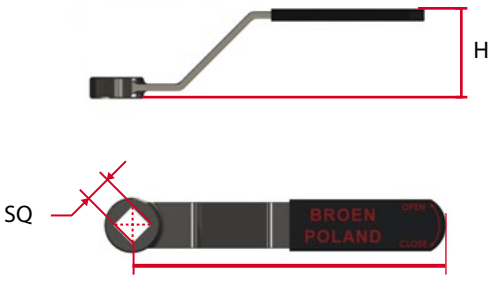
Levers, planetary gears, or any type of drive (electric, pneumatic, hydraulic etc.) can be mounted on the top of the stem extension or installed directly on the ball valve.
The height of the stem extension is measured from the axis of the valve to the top of the stem extension (dimension A).
This dimension should be provided when ordering a column.

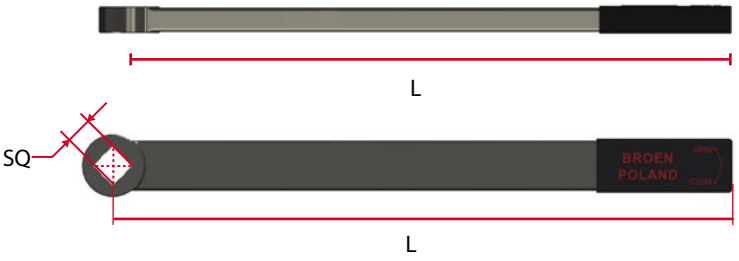
An example of an advanced layout of lubrication, drain, venting and bypass systems



Characteristics of standard size handles used in BROEN BALLOMAX® type AH ball valves

- Adapted to work with square connections in accordance with ISO 5211,
- Possibility of equipping the handle with a lock, e.g. a padlock,
- Fixing the handle on the connection with a screw,
- Special design at the customer's request, ie non-standard length, bending, connection, etc.

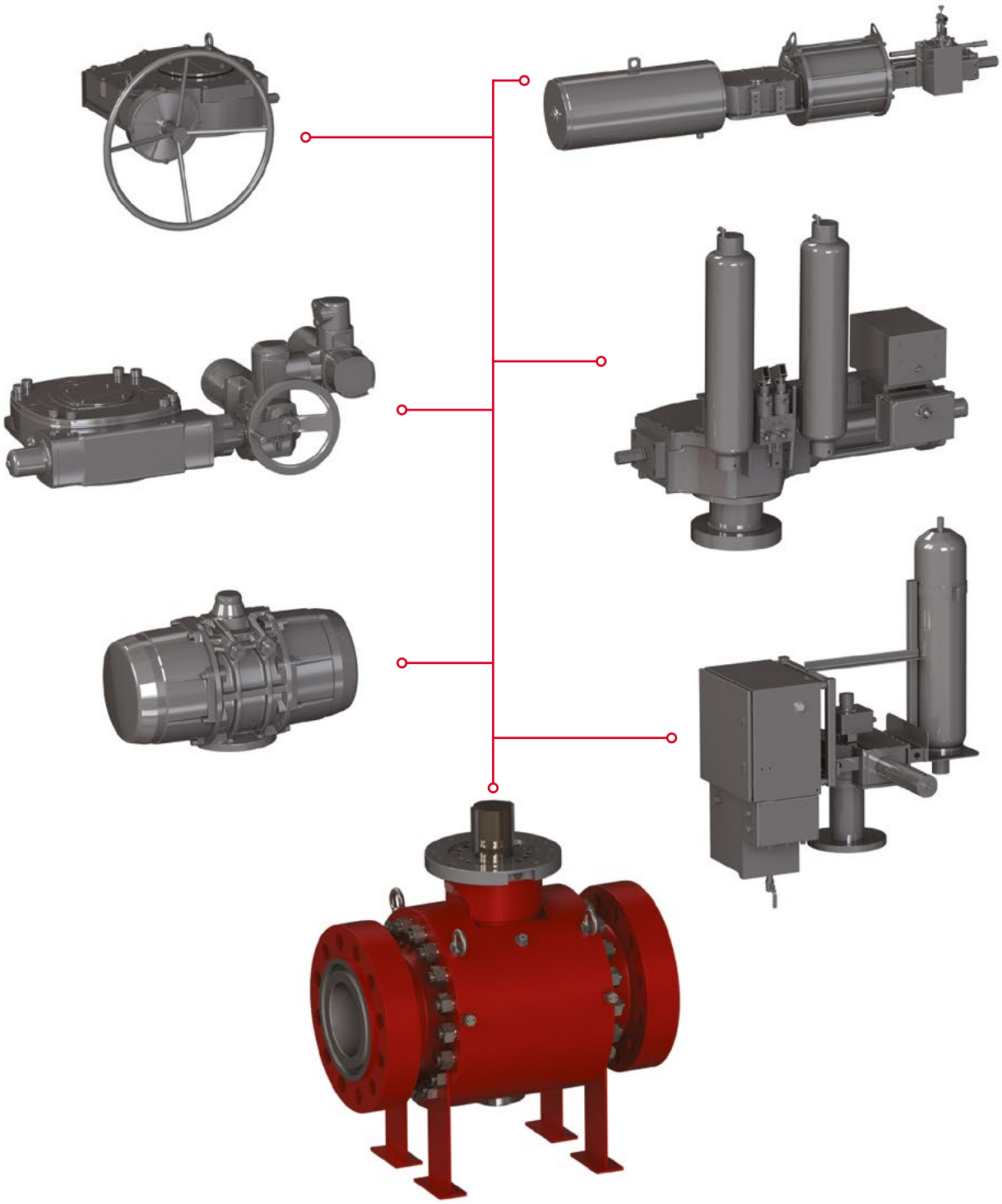




SQ [mm]	**L** [mm]	**H** [mm]	**Torque (max)** [Nm]
14	170	51	125
17	500	–	250
22	500	–	500
27	500	–	1000

Overview of gears and actuators used in BROEN BALLOMAX® type AH ball valves

BROEN BALLOMAX® type AH ball valves are available with a wide range of gears and actuators: manual, electric, pneumatic, electro-hydraulic, pneumo-hydraulic, etc.
Ball valves are equipped with drive connections in accordance with EN ISO 5211.



Our braud is our promise

BROEN
VALVE TECHNOLOGIES

BROEN Valve Technologies

For over 70 years, BROEN has been a world leader in the development and production of taps to control the flow of water, air, gas and fuels. BROEN provides complete solutions for HVAC construction installations and is a leading supplier of heating, gas and fuel taps.

We have excellent knowledge of the installation and technology of tap production, supported by many years of experience. Maintaining dialogue with our customers and worldwide partners, we produce valves that offer excellent and reliable quality.

The headquarter of the Broen Group is located in Assens, Denmark. Broen is part of the Aalberts N.V. Group.

More information at: **www.broen.pl**

pSales and production departments ●

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wersja 09.2023

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