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BROEN
VALVE TECHNOLOGIES

Operating manual for trunnion ball valves

DN150 – DN700

with equipment and accessories

DTR-TB.08_EN

Edition 03

Date: 21.02.2024

Table of Contents

0 Register of changes

Revision	No. of change	Person introducing the change	Date of change	Document point	Scope of the change
01	Z-069/20	KST	27.11.2020	4.3, 4.4, 4.5.1, 4.5.2, 4.5.3, 4.10	Update of valve types
02	Z-024/21	KST	15.04.2021	4.3, 4.5.3, 6.6, 8.1 4.6.1, 4.9, 4.10, 4.12, 6.3	Update of DN valve range Update
03	Z-014/24	ASN	21.02.2024	8.1	Update of valve durability and frequency operating of the valves

1 Introduction

This manual contains the necessary information regarding the use, construction, transport, storage, assembly, start-up and operation of the ball valve. It is intended for assembly, operating, using and supervising personnel. The manual is intended to provide users with all the necessary information and to help them complete all necessary tasks quickly and correctly.

This manual describes the construction of the ball valve its equipment and accessories with which it can be equipped. The type of valve and its exact parameters are described later in this manual.

The manual must be read, understood and followed by the above mentioned personnel. In any case, keep the operating manual within easy reach (near the fitting).

In particular, carefully read all safety instructions in this manual.

Please be advised that BROEN POLAND sp. z o.o. is not responsible in any way for any damages or operational defects resulting from failure to comply with these operating instructions.

BROEN POLAND sp. z o.o. reserves the right to make technical changes to the descriptions and data in this manual to improve the components and equipment of the ball valve.

2 Legal guidance

2.1 Copyright

The copyright to this operating manual remains the property of BROEN POLAND sp. z o.o.

The information and drawings contained in this manual may not be partially or completely copied, disseminated, as well as used for commercial purposes and entrusted to third parties without authorization.

2.2 General legal guidelines

Installation, commissioning, maintenance and supervision must be carried out only by authorized personnel, observing all safety requirements specified in standards and legal regulations.

Upon receipt of delivery, check all components (the ball valve and equipment and/or accessories if applicable) for possible transport damage. Only components in perfect technical condition may be installed and/or used.

If the maintenance work is neglected or carried out improperly, the warranty expires. Only original spare parts guarantee quality, safety and the possibility of replacement.

Making any modifications without the written consent of BROEN POLAND sp. z o.o. is forbidden and may invalidate the warranty.

In case of non-compliance with the recommendations, the manufacturer's warranty does not apply!!!

3 Safety tips and guidelines

The tips and guidelines presented in this chapter must be observed unconditionally!!!
If these guidelines and tips are not observed, the warranty does not apply!!!

3.1 Scope of application

The ball valve manufactured by BROEN POLAND sp. z o.o. is stop fittings (cut-off fittings).

The manual also includes items of equipment mounted on the ball valve (explanation of the term "items of equipment" in point 4.9).

The manual does not include accessories mounted on the ball valve (explanation of the term "accessory" in point 9).

Depending on the sealing system used, ball valves can be used for gaseous and/or liquid media.

3.2 Use

Proper use includes compliance with the instructions and guidelines of this operating manual, compliance with the operating conditions specified on the nameplate, declaration of compliance (possibly an inspection certificate) and compliance with applicable local health and safety and environmental protection regulations.

The ball valve and its equipment was designed, manufactured and checked according to recognized techniques and in accordance with internal quality parameters of BROEN POLAND sp. z o.o. and left the factory in perfect technical condition.

3.3 Safety rules

If the valve and accessories are used improperly or not in accordance with their intended use, they may endanger persons, property and the environment.

Media other than the specified ones and/or use beyond the permitted pressure and temperature range may lead to damage and/or leaks and pose a threat to the safety of persons, property and the environment.

No changes may be made to the ball valve and its equipment that could endanger the safety of persons, property and the environment without the manufacturer's written permission.

Every person who deals with assembly, commissioning, operation and supervision of fittings and equipment must read and understand the entire manual and hold documented qualifications to perform the work.

This manual must be kept at hand and in a secure place near the valve.

In the event of any defects that may pose a threat to the safety of persons, property and the environment, immediately inform the manufacturer and take appropriate precautionary measures.

Work on the ball valve and its equipment, such as repair, may only be carried out by the BROEN POLAND sp. z o.o. service and only when the fittings are depressurised and the energy supply to the accessories is switched off.

Work on the ball valve and its equipment such as inspection and maintenance may only be carried out with observance of special precautions and all safety rules.

When carrying out any work that may cause contamination and/or damage to the ball valve and its equipment, the entire assembly must be properly secured to prevent this.

4 Introduction

4.1 General description

The ball valve manufactured by BROEN POLAND sp. z o.o. is a shut-off valve used for 'closing' and 'opening' the flow of media.

The direction of flow of the medium does not matter - the valve guarantees bidirectional tightness.

The ball valve is designed to shut off the flow of medium through the piping system, it has no regulatory, control, safety, reverse, separating and mixing function.

The type of working medium determines the choice of materials for the construction of the valve and is given in the documentation provided and on the nameplate.

4.2 Application

The ball valve produced by BROEN POLAND sp. z o.o. is intended for group 1 and 2 media according to DIRECTIVE 2014/68/EU. Depending on the sealing system used, ball valves can be used for gaseous and/or liquid media.

4.3 Valve type

The operating manual applies to ball valves manufactured by BROEN POLAND sp. z o.o. for the following types:

Valve type	DN markings	PN markings	CL markings	Connection terminals
AH-14c...	150; 200; 250; 300; 350; 400; 500; 600	16, 25, 40	150	flanged FxF
AH-15c...	150; 200; 250; 300; 350; 400; 500; 600	16, 25, 40	150	for welding WxW
AH-14cr...	200/150; 250/200; 300/250; 350/300; 400/350; 500/400; 600/500; 700/600;	16, 25, 40	150	flanged FxF
AH-15cr...	200/150; 250/200; 300/250; 350/300; 400/350; 500/400; 600/500; 700/600;	16, 25, 40	150	for welding WxW

4.4 Construction and principle of operation

The ball valve type AH-14c...; AH-15c...; AH-14cr...; AH-15cr... has a steel body, fully welded and a ball embedded between two seals made of PTFE+C embedded in sliding seats sealed in relation to the body supported by springs. The ball was seated in the body rotationally on trunnions or yokes, in an axis perpendicular to the direction of flow. The closed valve keeps the seal tight thanks to the inlet seal pressed against the ball. The force of the seal on the ball ensures the pressure of the medium and the springs under the seat. These valves are insensitive to the thermal expansion of their components and are protected against excessive pressure increase inside the valve body (they have thermal and volumetric compensation).

The ball is rotated by means of a stem connected with a groove made in the ball. The ball's rotational movement is limited in the 90° range by a limiter or end stops mounted in the drive (connection for part-turn actuator according to EN ISO 5211). The ball valve is "open" if the indicator on the stem or the indicator on the gearbox or drive are parallel to the axis of the valve. The flow is closed by turning the stem clockwise to the stop position. The indicator in the "closed" position is perpendicular to the axis of the valve.

Depending on the type of valve, the body on both sides is terminated with flanged or welded ends adapted for connection to the system (for exact division see point 4.3).

4.5 Technical specifications

Explanations:
PS - maximum allowable pressure
PO - working pressure
TS - maximum allowable temperature
TO - working temperature

4.5.1 Operating temperature range - TO

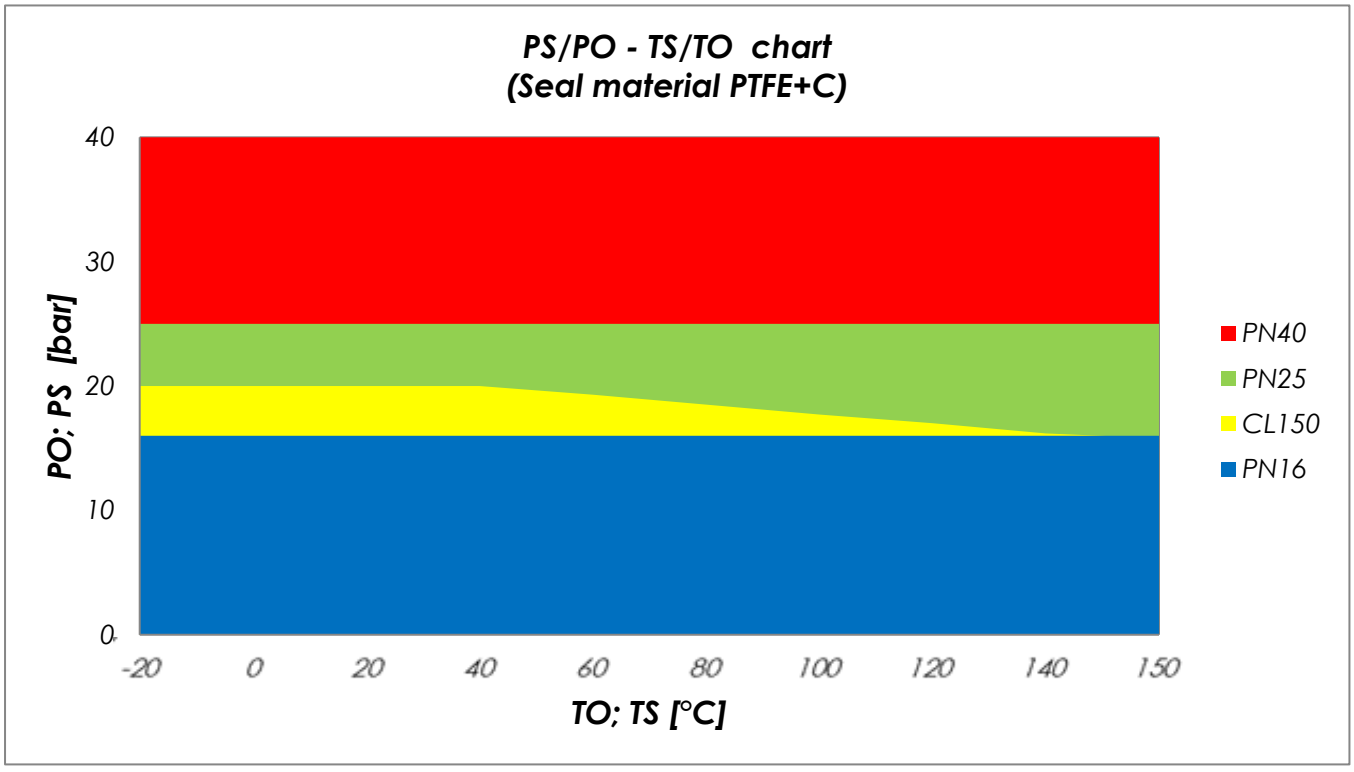
Temperature range - TO	Types of ball valves
-20 ÷ +150°C	AH-14c...; AH-15c... AH-14cr...; AH-15cr...
-10 ÷ +200°C	AH-14c...; AH-15c... AH-14cr...; AH-15cr...

4.5.2 Pressure dependence PS; PO from temperature TS; TO

For valve type AH-14c...; AH-15c...; AH-14cr...; AH-15cr...

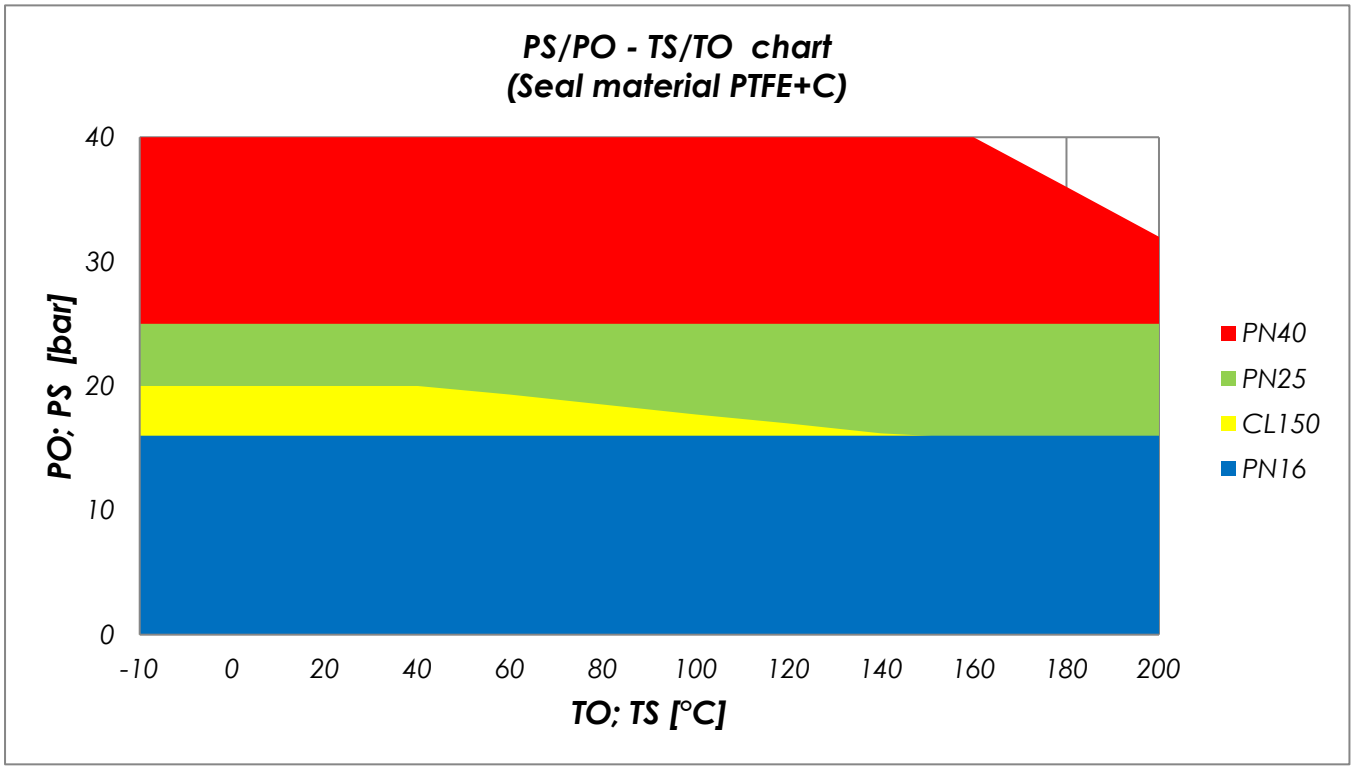
For the temperature range:
-20 ÷ +150°C

	PO; PS [bar]			
TO;TS [°C]	**PN16**	**PN25**	**PN40**	**CL150**
-20	16	25	40	20
-10	16	25	40	20
0	16	25	40	20
10	16	25	40	20
20	16	25	40	20
30	16	25	40	20
40	16	25	40	20
50	16	25	40	19.5
60	16	25	40	19.3
70	16	25	40	18.9
80	16	25	40	18.5
90	16	25	40	18.1
100	16	25	40	17.7
110	16	25	40	17.4
120	16	25	40	17
130	16	25	40	16.6
140	16	25	40	16.2
150	16	25	40	15.8



For the temperature range:
-10 ÷ +200°C

	PO;PS [bar]			
TO;TS [°C]	PN16	PN25	PN40	CL150
-10	16	25	40	20
0	16	25	40	20
10	16	25	40	20
20	16	25	40	20
30	16	25	40	20
40	16	25	40	20
50	16	25	40	19.5
60	16	25	40	19.3
70	16	25	40	18.9
80	16	25	40	18.5
90	16	25	40	18.1
100	16	25	40	17.7
110	16	25	40	17.4
120	16	25	40	17
130	16	25	40	16.6
140	16	25	40	16.2
150	16	25	40	15.8
160	16	25	40	15.4
170	16	25	38	15
180	16	25	36	14.6
190	16	25	34	14.2
200	16	25	32	14



4.5.3 Maximum torque

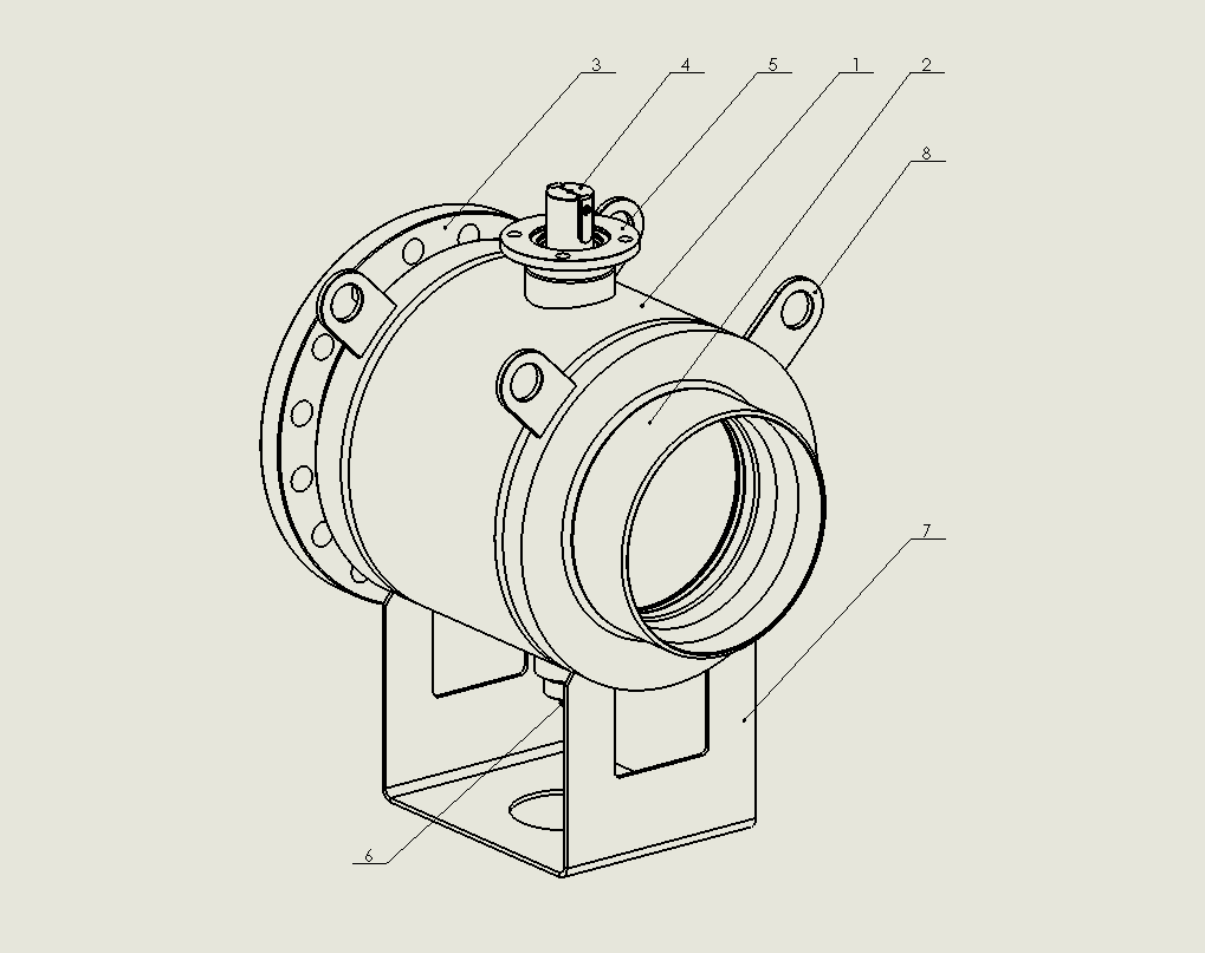
The value of the maximum torque (M max) used for operating for a given type and DN marking of the valve is presented below. It is limited due to the mechanical strength of the components used for operating. The actual torque of opening the valve depends on the operating parameters (PO, TO, medium, switching frequency, etc.).

Valve type	DN	M max [Mm]
AH-14c… AH-15c…	**150**	800
	200	800
	250	1800
	300	3000
	350	3500
	400	7500
	500	10000
	600	16000

Valve type	DN	M max [Mm]
AH-14cr… AH-15cr…	**200/150**	800
	250/200	800
	300/250	1800
	350/300	3000
	400/350	3500
	500/400	7500
	600/500	10000
	700/600	16000

4.6 Making the valve

4.6.1 Aboveground



1 - body
2 - welded end (it can be connection from both sides WxW, see point 4.3)
3 - flanged end (it can be a connection on both sides FxF, see point 4.3)
4 - stem
5 - flange for drive connections in accordance with EN ISO 5211 (see point 4.8.2)
6 - drain/vent plug (see point 4.8.3 and point 8.6)
7 - base (see point 4.9.1)
8 - transport grips (see point **Błąd! Nie można odnaleźć źródła odwołania.**)

4.7 Corrosion protection

4.7.1 External surfaces

The above-ground ball valve has external surfaces protected against corrosion with a paint coating (coating thickness approx. 100 µm). Some elements of the valve are protected against corrosion by galvanic coating.

Some external surfaces of the valve, such as (sealing surfaces of flanges, butt weld ends, etc.) are protected against corrosion by preservative during transport and storage.

4.7.2 Internal surfaces

The body's internal surfaces are protected against corrosion by a preservative for transport and storage.

Maintenance performed by the manufacturer protects the valve during transport and storage no longer than 6 months!!!

Elements such as the ball and the stem are protected against corrosion by galvanic coatings and/or are made of stainless or acid-resistant steel.

For more information on anti-corrosion coatings, contact the manufacturer BROEN POLAND sp. z o.o.

The kind, type and colour of the paint coating may be different after prior agreement during the order.

4.8 Functional elements

4.8.1 Stem protection against blowing

The stem anti-blow system complies with the requirements of EN 1983.

4.8.2 Drive flange

The flange for part-turn actuator according to EN ISO 5211 is used for mounting various types of drives on valves.

4.8.3 Double block and bleed (DBB)

Double Block and Bleed (DBB).
For a detailed description of using this function, see point 8.6

4.9 Equipment components

4.9.1 Base

The base is used to support the valve on the foundation to eliminate the influence of the valve's weight together with the medium on the piping system. The base cannot be attached to the foundation in any way. It must be able to move freely. The foundation just needs to support the valve through the base. The valve base may not be a support for piping.

4.9.2 Drain valve

The drainage valve is used to drain the medium between the ball and the body in the open or closed position of the ball. The drain valve operation parameters are the same as for the main valve.

4.9.3 Stem extension column

The stem extension column is used to lead and move the stem end to a certain distance from the axis of the valve (pipeline). It is an element that is designed to only transfer torque from the drive to the main valve stem and the weight of the accessory.

4.9.4 Transport grips

The transport grips used for ball valves of lifting components in order to lift the valve. These components must be used first to handle the product (see 6.3).

The column cannot be subjected to bending forces and moments!!!

4.10 Equipment configuration

Key:
X – standard version
(X) – special version agreed upon in the order
FxF – flanged end on both sides of the valve
WxW – welded end on both sides of the valve
DBB – Double Block and Bleed
ISO F – valve reversing via drive; adaptation to drive according to EN ISO 5211
PO – base
DV – drain valve
KO – stem extension column
UT – transport grips

Valve type	DN	End	DBB	ISO F	PO	DV [1]	KO	UT
AH-14c… ; AH15c…	150-350	FxF; WxW	X	X	(X)	(X)	(X)	(X)
	400-600	FxF; WxW	X	X	X	(X)	(X)	X
AH-14cr…; AH-15cr…	200-400	FxF; WxW	X	X	(X)	(X)	(X)	(X)
	500-700	FxF; WxW	X	X	X	(X)	(X)	X

[1] the drain valve is only present together with the base

4.11 Tests carried out at the manufacturer

Factory tests of the valve are carried out in accordance with the requirements of EN12266-1 and 2, or in accordance with other specifications specified in the order.

All valves (100%) are tested.

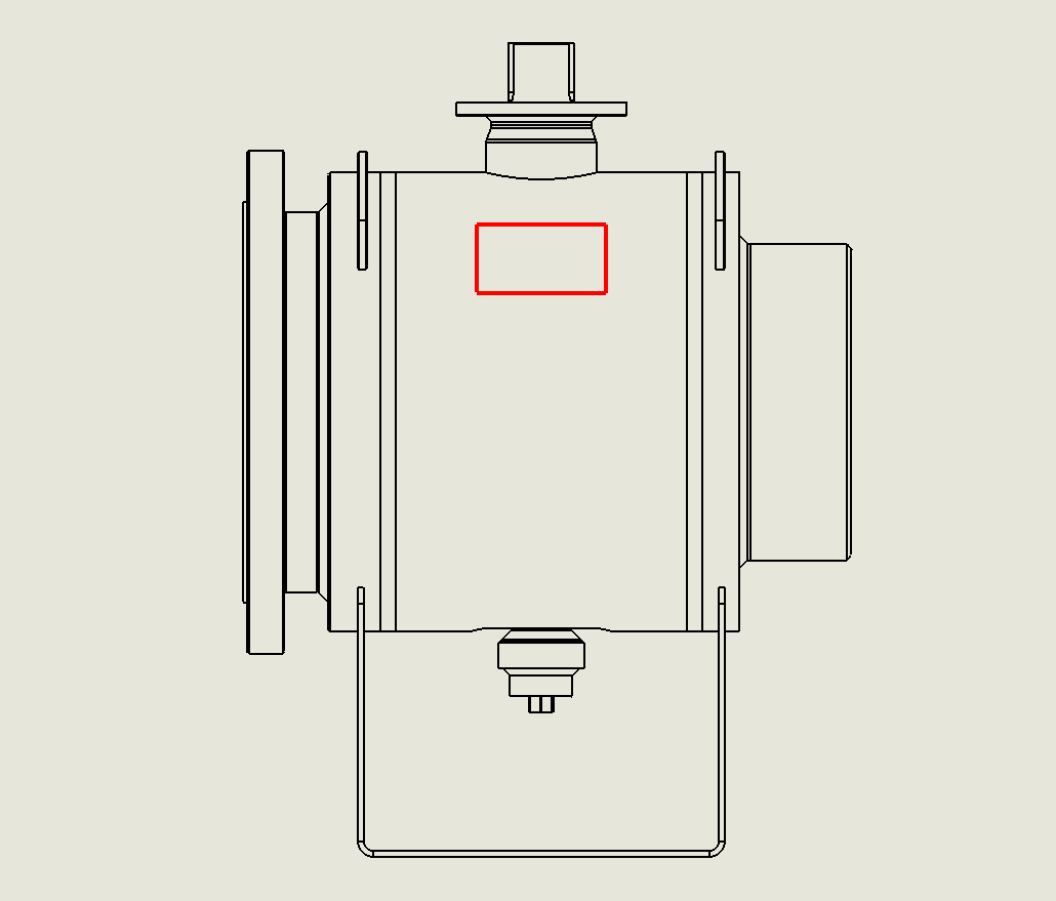
Standard tests of the valve:

- shell strength - P10,
- shell tightness - P11,
- seat tightness - P12; the closing tightness was checked for both flow directions - tightness class "A" according to EN 12266-1 item A.4.3,
- functional test - F20.

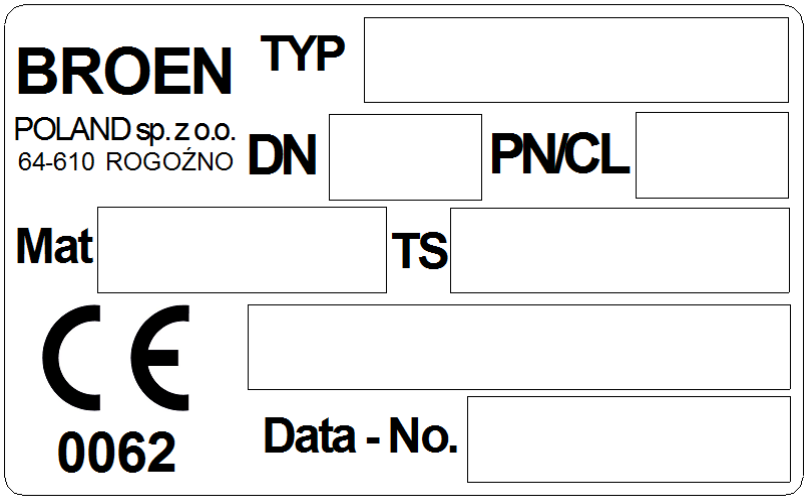
4.12 Marking

Each valve has a nameplate. The placement of the plate, depending on the version, is marked in red and is shown below:

- for aboveground valves - a plate on the body



The following are examples of name plates placed on valves:



5 Delivery

5.1 Delivery check

- The valve is delivered in durable and/or original protective packaging; damage to the packaging may indicate damage to the valve, any damage should be documented with pictures if necessary,
- The valve's connection ends should be protected with covers; do not remove the covers until the valve is installed on the piping system (see point 6),
- The valve should be in the "open" position,
- Check the completeness and compliance of the delivery with the bill of lading, documents provided and markings on the nameplate of the valve and accessory.

5.2 Packing

The valve is packed in a durable packaging consisting of environmentally friendly materials, easy to sort and recoverable. The packaging materials are wood, cardboard, paper and PE foil. Packaging recycling is recommended to be entrusted to a recycling company.

5.3 Transport

- The valve should be in the "open" position during,
- Special care should be taken when loading and reloading the valve together or without equipment and/or accessory;
- The valve during transport, together with the packaging, should be permanently attached and/or secured against displacement and tipping over inside the means of transport it is transported in.
- The recipient is responsible for proper unloading and/or transshipment (you can use the description provided in point 6.3 and 6.4).

When moving valves equipped with an accessory and/or column, do not support, grab, lift, etc. for the items mentioned above!!!

Damage resulting from the wrong way of transport is not the basis for product complaint.

5.4 Storage

- The valve's connection ends should be protected with covers; do not remove the covers until the valve is installed on the piping system (see point 6),
- Unpainted surfaces of the valve should be preserved with an anti-corrosive agent,
- The ball valve must be stored in rooms protected against atmospheric influences and corrosive factors; preferably in a roofed room, on a flat surface, in a dry and clean place,
- Keep the valve in a stable position in a safe place,
- The valve should be in the "open" position.

Maintenance performed by the manufacturer protects the valve for transport and storage no longer than 6 months!!!

6 Installation on the system

6.1 Introduction

- You must notify BROEN POLAND sp. z o.o. of installing the valve on the system 6 business days in advance.
- The valve may only be installed by trained personnel who have read the requirements of this manual,
- The valve delivered to the customer is ready for installation on the system after unpacking and removing all protective elements,
- The direction of flow of the medium does not matter - the valve guarantees bidirectional tightness,
- The ball valve may be mounted at the end of the piping system, provided that it is permanently blinded from the outlet side; see requirements of point 6.5; 6.6,
- Standard lifting devices together with all lifting components (i.e. belt or hose slings; hooks, etc.) must have adequate lifting capacity not less than the weight of the valve or valve with equipment and/or accessory. They must allow safe manoeuvring.

6.2 Unpacking and preparation for installation

6.2.1 Unpacking

Unpacking involves:

- disassembly of the protective packaging elements;
- disassembly of all fastening elements to the packaging;
- a thorough inspection of the state of the valve together with equipment and/or accessories; in case of any damage to the elements or painting coating, it is absolutely necessary to inform the manufacturer BROEN POLAND sp. z o.o.

Use only professional tools to remove the protective packaging!!!

6.2.2 Preparation for installation

Preparation for installation involves:

- making sure that the valve is to be installed at the given installation site; checking the compliance of the data on the nameplate with the data in the technical documentation of the system;
- absolute cleaning of the connection place on the pipeline system,
- absolute cleaning of the system's internal space from any contamination,
- disassembly of blinding elements of the ball valve such as:
  - connection ends covers,
  - in the case of a valve without a drive, remove the stem position lock.

The blinding elements can only be removed prior to direct installation on the system!!! An earlier removal may lead to permanent damage to the valve!!!

- checking that the valve is in the "open" position; if not, please inform the manufacturer BROEN POLAND sp. z o.o. about it, who decides whether to allow further installation;

The valve must be in the "open" position during installation!!!

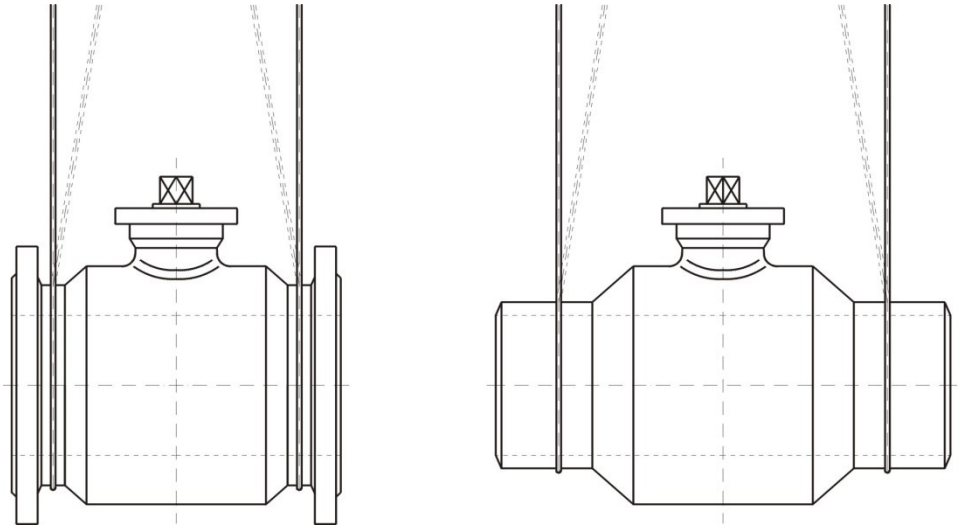
- checking the cleanliness of the inside of the ball valve (through hole),
- removal of the preservative from the ends and internal components of the ball valve (to remove the preservative use extraction gasoline or PLP 00020 thinner by Peter-Lacke)

The preservative must be removed!!!

6.3 Fastening when moving

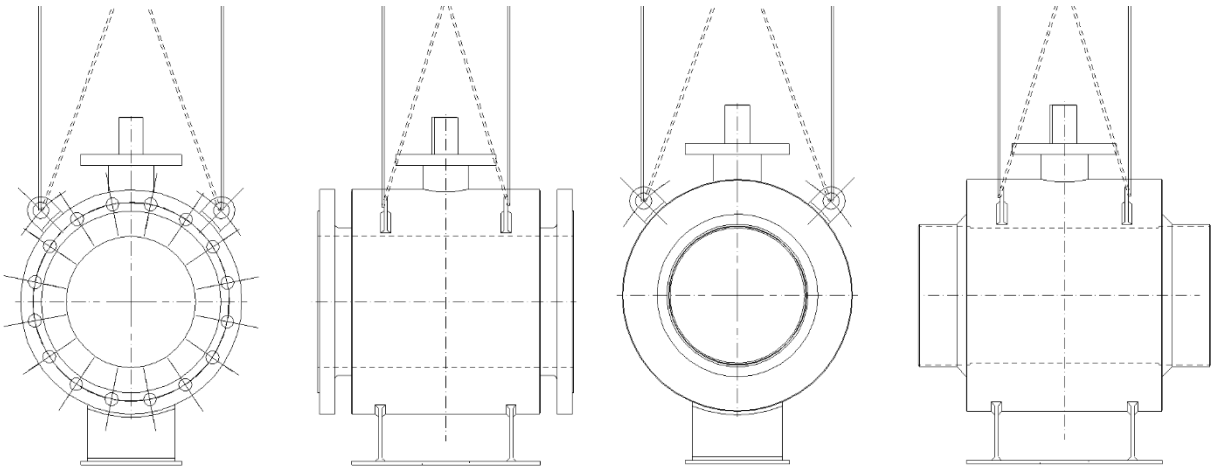
6.3.1 Fastening without handles

A valve that does not have transport handles - moving should be done manually or using standard slings (chains are not recommended).



6.3.2 Fastening with grips

The ball valve with transport grips must be carried by hand or with standard lifting equipment. Fasten by the grips as shown in the illustrations below.

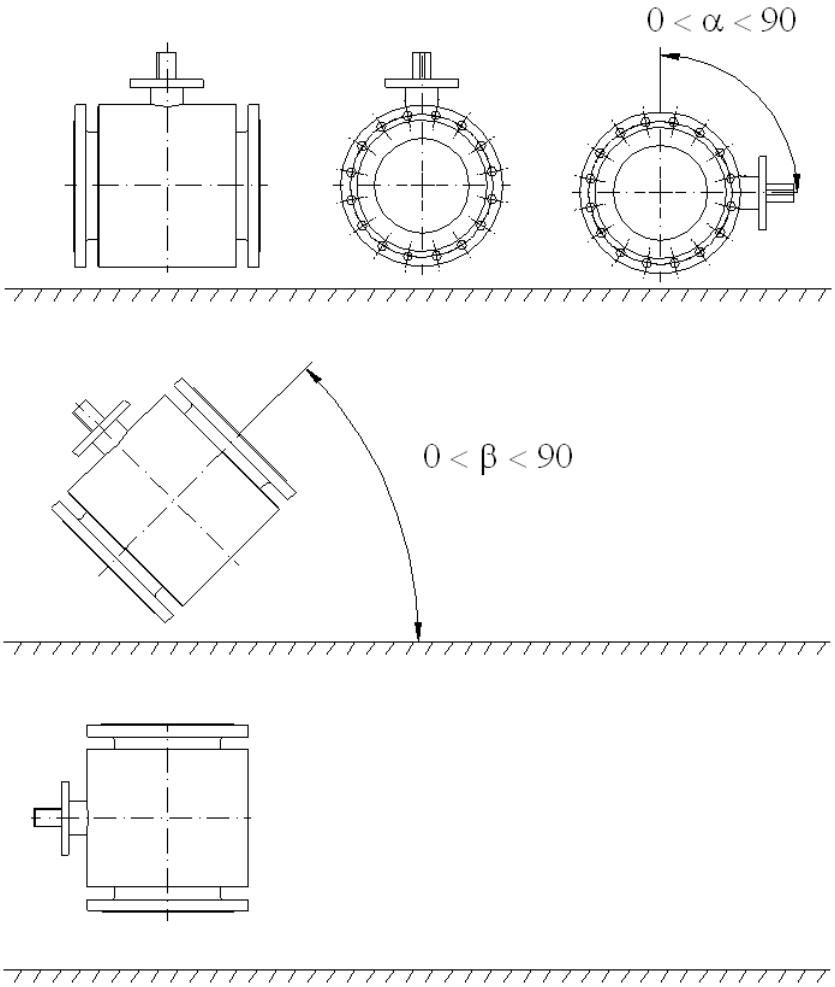


Be very careful when moving the valve!!!
Lifting elements must not press and/or lean against the accessory!!!

6.4 Mounting positions

Ball valves manufactured by BROEN POLAND sp. z o.o. can be installed in the following positions on the piping system:

- horizontal; the axis can be turned in the range of $0° \leq \alpha \leq 90°$ (left or right)
- at an angle to the ground $0° \leq \beta \leq 90°$
- vertical



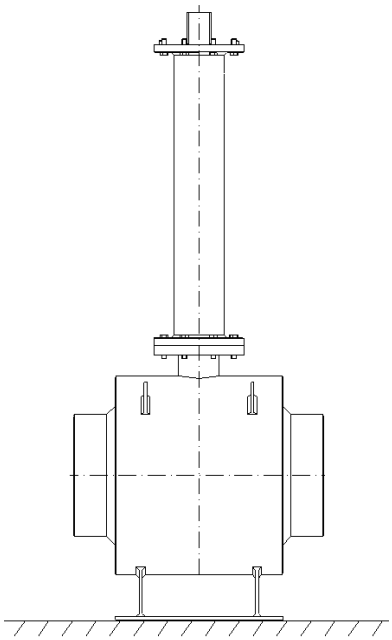
The ball valve may not be installed in any other position than shown above.

The mounting position of the valve may be different after prior agreement with BROEN POLAND sp. z o.o. and obtaining written consent.

If the valve has a base, place it on a foundation suitable for the base.

Do not attach the valve base to the foundation!!!

If the valve is equipped with an extension column, mount only in a vertical position (see the drawing below).



The installation position of the valve with the column may be different after prior agreement with BROEN POLAND sp. z o.o. and obtaining written consent.

6.5 Installation of the flanged valve

All the requirements of point 6.2, 6.3 and 6.4 must be met, and:

- set the valve position with a few screws on the installation; so that the flanged seal can be safely and correctly positioned;
- insert a flanged seal;
- insert the remaining bolts into the holes in the flanges;
- make sure there are no misalignment errors between the valve and the opening in the installation and all holes in the connecting flanges;
- make sure there are no parallel errors in the sealing surfaces of the flanges;
- tighten screws for flange connection, tighten crosswise (opposite) until proper tension is achieved

The piping designer is responsible for the correct selection of screws, nuts and flanged seals.

The piping designer is responsible for providing the value of the torque required to tighten the flanged connection screws.

Flanges used in the ball valve are made according to EN 1092-1 as type 01 or 11 (another type after agreement when ordering), the material from which they were made belongs to the group 8E3.

Flanges used in the ball valve are made according to EN 1759-1 as type 01 or 11 (another type after agreement on the order), the material from which they were made belongs to the group 8E3.

In the case of a valve fitted at the end of the system, a blinding element must be fitted to the free outlet. The designer and contractor of the piping system is responsible for the correct method of blinding.

Do not operate the valve during installation work!!!
The first closing operation can be carried out after thorough cleaning and/or sucking of all impurities after installation!!!
Failure to comply with the above recommendations may result in damage to the seal and loss of sealing of the fitting!!!

6.6 Installation of the welded valve

The valve must be in the "open" position!!!

All the requirements of point 6.2, 6.3 and 6.4 must be met, and:

- assemble according to accepted pipeline assembly technology,
- position the valve welded end coaxially to the pipe of the piping system,
- make sure that there are no misalignment errors in the valve's connection end to the hole in the pipe,
- weld in accordance with the technical conditions to be met by the pipeline and in accordance with WPS;
- during welding, check the temperature of the valve body at a distance of X from the welding site, after exceeding 120°C immediately stop the welding process.

DN	X [mm]
DN150-DN700	100 -120

In the case of a valve mounted at the end of the system, a blinding element must be fitted to the welding terminal or pipe where the outlet is free. The designer and contractor of the piping system is responsible for the correct method of blinding.

Do not operate the valve during installation work!!!
The first closing operation can be carried out after thorough cleaning and/or sucking of all impurities after installation!!!
Failure to comply with the above recommendations may result in damage to the seal and loss of sealing of the fitting!!!

7 Tests on the system or prefabrication

- You must notify BROEN POLAND sp. z o.o. of system or prefabrication tests 6 business days in advance.
- Tests may be performed by trained personnel who have read the requirements of this manual.
- Tests on the system should be made as hydraulic. If there are other technical reasons or contraindications, pneumatic tests can be performed.
- In the event that leak testing of the ball valve is to be carried out, the manufacturer's written consent must be obtained containing the conditions for carrying out the test in order to prevent damage to the ball valve.

Tests should be carried out after thorough cleaning and/or blowing the pipeline system to remove solid and other impurities!!!
All precautions should be taken to avoid potential danger to persons, property and the environment!!!

7.1 Strength and tightness test of the piping system

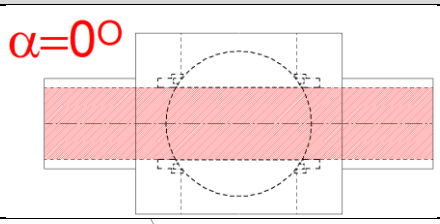
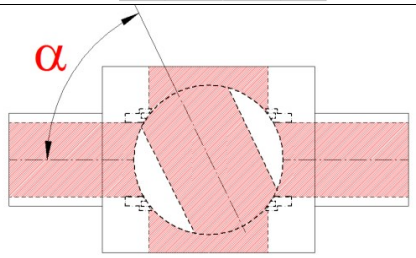
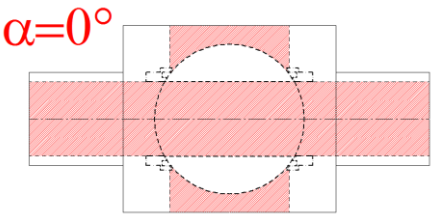
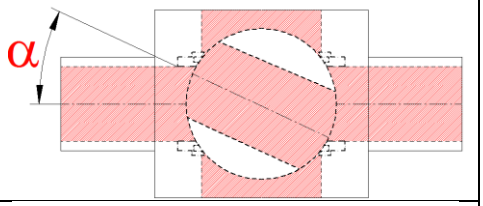
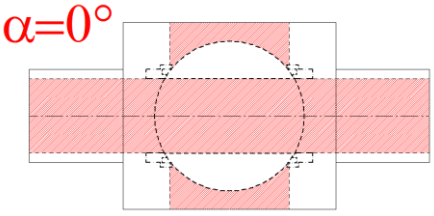
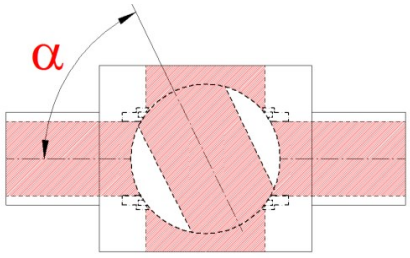
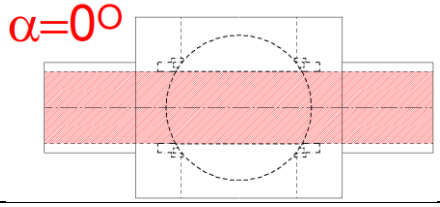
PS – maximum allowable valve pressure
$PT_{inst.}$ - pipeline system test pressure

Allowable duration of the pressure test of the piping system:

	$PT_{inst.} \leq PS$	$PS \leq PT_{inst.} \leq 1.1xPS$	$1.1xPS \leq PT_{inst.} \leq 1.5xPS$
Time [h]	Without limits	max. 48 h	max. 2 h
Comments	none	longer time after consultation with BROEN POLAND sp. z o.o.	longer time after consultation with BROEN POLAND sp. z o.o.

The test pressure must not be greater than 1.5xPS

It is not allowed to leave the valve in the "closed" position during the test of strength and tightness of the pipeline system!!!

Operations sequence	Description of the operation	Placement of the valve ball
1	Put the valve to the "fully open" position (α=0°)	
2	Fill the system with liquid (pure water or water with a corrosion inhibitor)	
3	Open the valve by an angle α=75° in relation to the open position - **for max. 2 h**	
4	Top up the system with liquid	
5	Apply the strength test pressure of the system PT_{inst}	
6	Put the valve to the "fully open" position (α=0°)	
7	Test the strength - **for time see the table** "Permissible duration of the test pressure of the pipeline system"	
8	Open the valve by an angle α=15° in relation to the open position - **for max. 30 min**.	
9	Reduce the pressure to the system required for the tightness test	
10	Put the valve to the "open" position (α=0°)	
11	Perform the tightness test - **for time see the table** "Permissible duration of the test pressure of the pipeline system"	
12	Open the valve by an angle α=75° in relation to the open position - **for max. 2 h**	
13	Relieve fluid pressure	
14	Put the valve to the "fully open" position (α=0°)	
15	Drain the piping of liquids	
16	Drain and dry the valve (see point 7.2)	

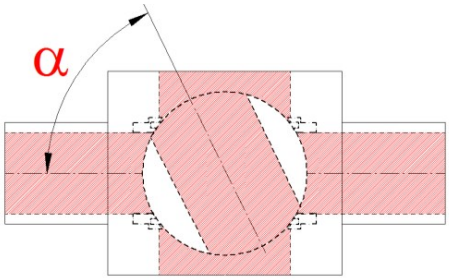
7.2 Drainage and drying

After the hydraulic tests, thoroughly dry the system and the valve!!!

7.2.1 Drainage

Only for valves that are fitted with a plug or drainage system

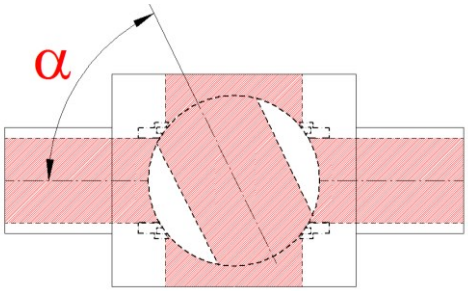
- Put the valve to the α=75° position for no longer than 2 hours.



- Supply compressed air or other suitable gas, e.g. nitrogen, etc.,
- pressure max 8 bar.
- Open the plug (see point 8.6).
- Wait until no more air and water comes out of the hole; only air, nitrogen or other suitable material must get out.
- Put the valve to the "open" position.
- Close the plug (see point 8.6).

7.2.2 Drainage

- Put the valve to the α=75° position for no longer than 2 hours.



- Give the drying medium (air, nitrogen or other suitable gas), pressure max. 2 bar.
- The temperature of the medium used for drying max. +60°C
- Put the valve to the "open" position.

Drainage should be carried out after dehydration if there are technical possibilities!!!

8 Operation of the valve

8.1 General description

The ball valve must be operated in accordance with the requirements for the shut-off valve in the "fully open" or "fully closed" position. Leaving or operating in a position other than the above may damage the ball seal.

Check the position of the ball optically on the indicator (mark on the stem or position indicator on the drive).

The manufacturer provides 30-year durability of valve elements working on operating parameters not exceeding the dependence of the "PO-TO" valve.

The number of valve cycles during its service life guaranteeing its performance is **minimum:**

Number of cycles open - close - open	DN
500	150-700

The assessment of the expected actual life of the valves should be made after obtaining the physicochemical data of the valve assembly environment and the flowing medium.

The valve should be operated at least once every 12 months!!!
If it is not possible to completely close the medium flow, the ball can be rotated by ~50% of the range
(by an angle of ~45°) and returned to the previous state!!!

8.2 Medium

See point 4.2 and information on the valve name plate.
The medium should have parameters compatible with the physicochemical properties recorded in the substance safety data sheet.

It is not allowed to operate the valve at a temperature lower or equal to the solidification point of the medium, at a given operating pressure!!!
Operation is not allowed for medium that has solid impurities!!!

In order to avoid coagulation, which may cause a potential hazard to persons, property and the environment, the ball valve should be drained (see point 7.2.1) each time there is a suspicion of such a situation.

8.3 Dependence of working pressure (PO) on working temperature (TO)

The relationship between the operating pressure (PO) and the operating temperature (TO), see point 4.5.2.

Protection against exceeding the permissible pressure and temperature limits:
Where, in reasonably foreseeable conditions, the permissible limit values could be exceeded, pressure equipment must be fitted with appropriate safety devices or it must be possible to connect them, unless the devices are to be protected by other safety devices within the assembly.
In the case of pressure relief devices, they must be so designed that the pressure does not permanently exceed the maximum allowable pressure PS.

8.4 Valve control

The valve is controlled in the following way:

- clockwise rotation of the stem closes the valve,
- anti-clockwise rotation of the stem opens the valve.

A drive must be mounted on the stem. The valve can be fitted with a column, which is an extension of the stem. For a detailed description, see point 4.9.3.

The operating should be smooth without any jams with a perceptible constant resistance indicating the mutual tension at the ball-seal contact, which guarantees tightness. Exceeding the maximum torque [M max] may damage the ball, stem, column or elements limiting the angle of rotation.
Maximum torque values [Mmax] see point 4.5.3.

8.5 Maintenance

The ball valve requires no maintenance throughout its life. Check the condition of the anti-corrosive coating and the condition of connection of the valve to the system. The valve should be protected against mechanical damage and kept clean, especially in places enabling ball position control. Replace the valve during pipeline renovation based on wear assessment. Valves do not require spare parts. Repair the valve at the manufacturer.

8.6 DBB

Check if the DBB system is present in the given type of valve, see point 4.10.

The DBB ("Double Block and Bleed") system allows the pressure closed in the space between the ball and the body to be released. This allows you to check the tightness of the closure without having to shut the valve out of service.

To do this, unscrew the drain plug and leave it in this position until the space between the body and the ball is completely empty. The larger the valve, the longer the emptying time will be.

Pay special attention when unscrewing the drain plug so as not to unscrew it completely, as it may cause the plug to blow!!!
Unscrewing the plug: 2 full turns!!!

Torques with which the drain and blind plugs must be tightened

Thread size	Size of the key to unscrew	Maximum torque [Nm]
G ¾”	S=21	80
G 1”	S=24	120

In the case of valves equipped with a drain valves, drainage should be done by partially reversing the main valve (min. 30°) and then setting the main valve to "closed". After this operation, remove the drain valve blinding element and then open the drain valve on the column.
The drain valve is equipped with a handle.

Take special care when carrying out the drainage process!!!
It is forbidden to stay on the fluid outlet line from the drainage system!!!

After the space between the body and the ball is completely empty, close the drain valve and then install the blinding element.

8.7 Troubleshooting

FAULT	CAUSE	METHOD OF REPAIR
Leak in the flow	1. The valve is not completely closed	Set the valve to the "fully closed" position
	2. Incorrect setting of ball rotation limiters	Correct the limiters (contact BROEN POLAND sp. z o.o.)
	3. Damage to the ball seals	Replace the seals (contact BROEN POLAND sp. z o.o.)
	4. Damage to the ball surface	Replace the ball (contact BROEN POLAND sp. z o.o.)
Leak at the stem	1. Damage to the stem seals	Replace the seals (contact BROEN POLAND sp. z o.o.)
	2. Damage to the stem	Replace the stem (contact BROEN POLAND sp. z o.o.)
Difficulties in opening and closing the valve	1. Incorrect pressure increase	Verify pipeline pressure
	2. Impurities at the joint ball - seal	Wash, clean the inside of the valve
	3. Precipitation in the medium which settles on the surface of the ball	Remove sediment
	4. Mechanical damage to the surface of the ball and seals	Replace the ball and seals (contact BROEN POLAND sp. z o.o.)
	5. Foreign body in the valve bore	Remove flow obstructions
	6. Seizure on the stem	Stem replacement, body regeneration (contact BROEN POLAND sp. z o.o.)
	7. Wrong drive	Replace the drive with the correct one (contact BROEN POLAND sp. z o.o.)

8.8 Warnings

It is not allowed to disassemble any elements that are an integral part of the ball valve!!!

It is not allowed to disassemble the drive without the written consent or participation of the BROEN POLAND sp. z o.o. service!!!

It is not allowed to adjust the position of the drive bumpers without the written consent or participation of the BROEN POLAND sp. z o.o. service!!!

Drives mounted on valves of BROEN POLAND sp. z o.o. are protected with seals to prevent unauthorized dismantling. Breaking the seals will void the warranty!!!

Depending on the application, the surface of the ball valves together with equipment and accessories may be at high or low temperature. Contact with hot or cold surfaces can cause serious injury and loss of life or health. Always refer to the information about the maximum and minimum operating temperature of the valve on the name plate. Warning and marking of the possibility of high or low temperatures and protection against their effects lies solely with the responsibility of the designer and/or contractor of the system!!!

BROEN POLAND sp. z o.o. is not responsible for any temporary or continuous exceeding of the range of valve parameters and the application of a medium not complying with the name plate!!!

Correct installation of ball valves on the piping system is solely the responsibility of the contractor of the system!!!

BROEN POLAND sp. z o.o. is not responsible for any damages resulting from improper opening or closing of the valve, including the effects of violent openings and closures. The selection of the minimum valve opening/closing time depends on the nominal diameter, operating parameters and other factors and is the sole responsibility of the operator of the system!!!

9 Accessories

The term 'accessory' includes elements such as:

a) handle,
b) mechanical gear (planetary, worm, etc.),
c) drive (electric, pneumatic, electro-hydraulic, etc.),
d) end position sensor,

The accessories of items b) and c) are connected to ball valves or stem extension columns via a part-turn drive attachment in accordance with EN ISO 5211. The size and type of end for part-turn drive are selected by BROEN POLAND sp. z o.o. It depends on the type of valves, DN, PN and other operating parameters of the particular ball valve.