DATA SHEET TB 22a

BR 22a · Stainless steel Bottom Drain Ball Valve

With tilted shaft · DIN and ANSI Version

CE

Application

Non-clogging, tight-closing bottom drain ball valve of stainless steel for corrosive media, especially suitable for vessels

- **Nominal size DN 50 to DN 150 and NPS2 to NPS6**
- **Nominal pressure PN 10 to PN 40 as well as cl150 and cl300**
- **Temperatures up to 200°C**

The control equipment consists of a bottom drain ball valve and a pneumatic quarter-turn actuator or a hand-lever.

The valves, which are of modular construction, have the following features:

- Different body inlet sizes and versions and a novel ball arrangement which prevents plugging
- Especially suitable for vessels of stirring machines
- For on-off operation with a particulary small leakage rate
- Body, Ball and Stem in stainless steel or special materials
- Exchangeable seat rings.
- Stem sealing by spring-loaded V-ring packing
- Particulary small installation lengths
- Straight flow
- Connections acc. to DIN ISO 5211.

Fig. 1 - BR 22a Bottom drain ball valve - Type X

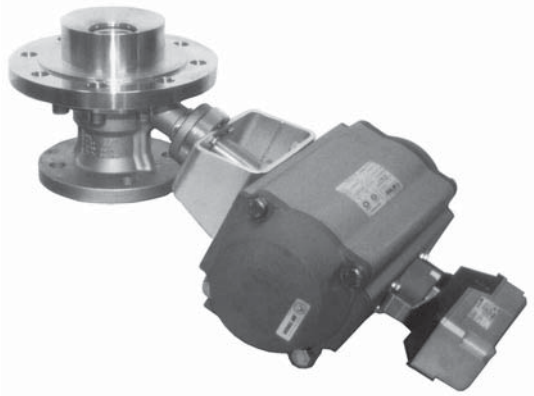

Fig. 2 - BR 22a Bottom drain ball valve with BR 31a Quarter-turn actuator

Versions

Bottom drain ball valve BR 22a alternatively in the following designs:

- Bottom drain ball valve with hand-lever
- Bottom drain ball valve with hand-operated actuator
- Bottom drain ball valve with pneumatic quarter-turn actuator, available with or without spring mechanism (for details see respective data sheet).

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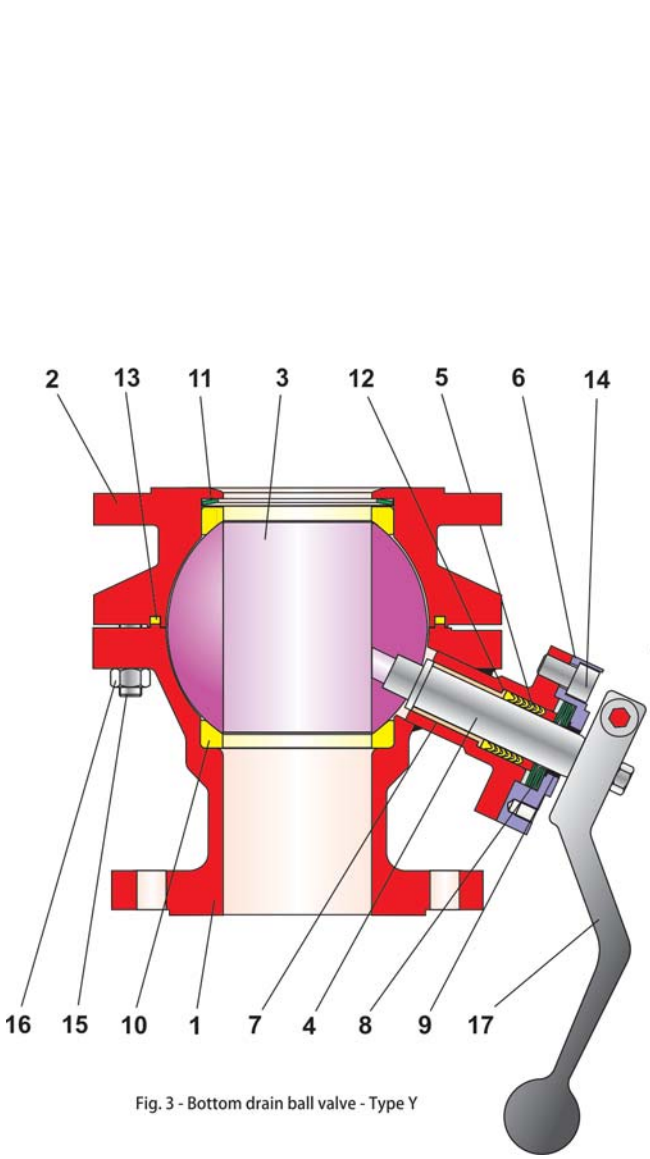

Fig. 3 - Bottom drain ball valve - Type Y

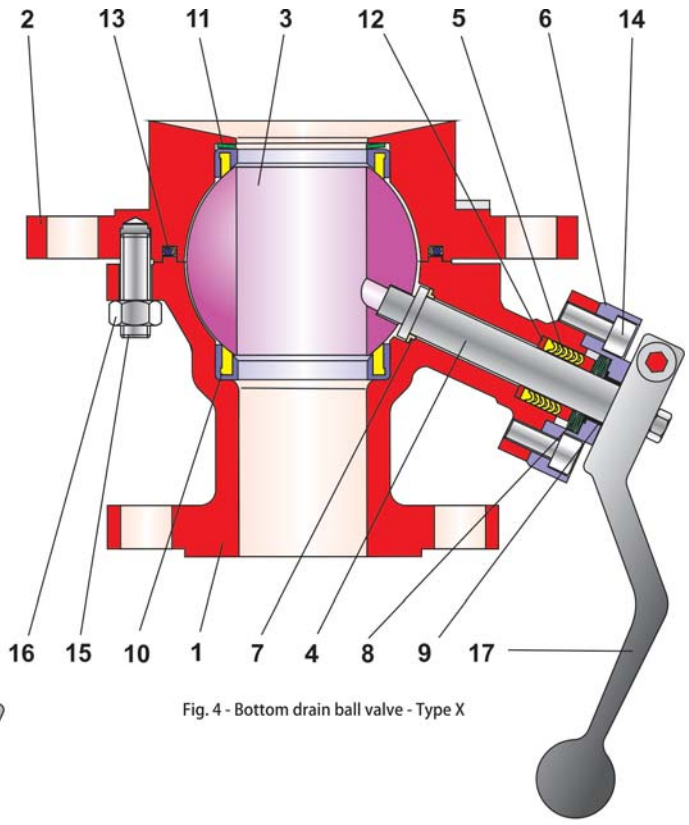

Fig. 4 - Bottom drain ball valve - Type X

Item	Description
1	Body outlet
2	Body inlet
3	Ball
4	Shaft
5	V-ring packing
6	Gland flange
7	Bearing bush
8	Disc spring set
9	Bearing bush

Item	Description
10	Seat ring
11	Disc spring
12	Thrust washer
13	Body sealing
14	Screw
15	Stud bolt
16	Nut
17	Lever

Table 1 - List of parts

Special designs

- Body in special material (e.g. hastelloy)
- Drain bore in the ball
- Nominal size DN 25, DN 40 and up to DN 300 available
- Pressure rating > PN 160 on request
- Heating jacket version
- Metallic sealing system
- High temperature version
- Body with rinsing connection
- With sampling device in stainless steel

Principle of operation

Please note, normally the bottom drain valves of BR 22a is assembled with the bigger sized flange at the bottom flange of the vessel.

The rotatable ball (3) has a cylindrical passage and runs on bearings with an inclination of 25° towards the joint between body inlet and body outlet.

The flow across the free area between body (1) and passage is determined by the opening angle.

The shaft (4) can either be coupled with a pneumatic actuator via an adapter or be equipped with a lever (17).

Ball sealing is provided by exchangeable stainless steel seat rings (10) with PTFE insert.

The ball shaft is sealed by a PTFE V-ring packing (5). This self-adjusting packing is preloaded by disc springs located above the packing and needs no maintenance.

In order that the valve can be adapted to the respective bottom flange of the vessel, there are two body inlet versions available for each valve size: a short (Type Y) and a long (Type X) connection piece.

Because of the particulary and optimum design of the valves, the inlet body with it´s variable part can be adapted optionally to the bottom of the vessel.

The long connecting piece of the type (X) is guided into the bore of the vessel and the arrangement of the ball to the product is very close and without almost any cavity which prevents the plugging of the valve.

Note:
Please, pay attention to the usebility acc. to the ATEX 2014/34/EU in correspondence to the maintenance sheet before using the ball valve in hazardous area!

Failure position

In dependance of mounting position of the actuator there are two failure positions, wich take place by pressure relieving or on failure of air supply:

- **Ball valve with actuator “on failure closing”**

  While air failure, the valve is closed. The valve opens when the signal pressure increases, acting against the force of the springs.

- **Ball valve with actuator “on failure opening”**

  While air failure, the valve opens. The valve closes when the signal pressure increases, acting against the force of the springs.

Optional material combinations

For best adaption to process conditions, it is possible to optimize ball valve by modification of materials (eg. body, shaft, ball and sealing).

Additional equipment and accessories

For the control valves, the following accessories are available either individually or in combination:

- Pneumatic and electric quarter-turn actuators
- Positioner (with optional control ball valve)
- Limit switches
- Solenoid valves
- Filter regulator

Further accessories are available on request for customer specifications

Advantages of the live-loaded sealing system

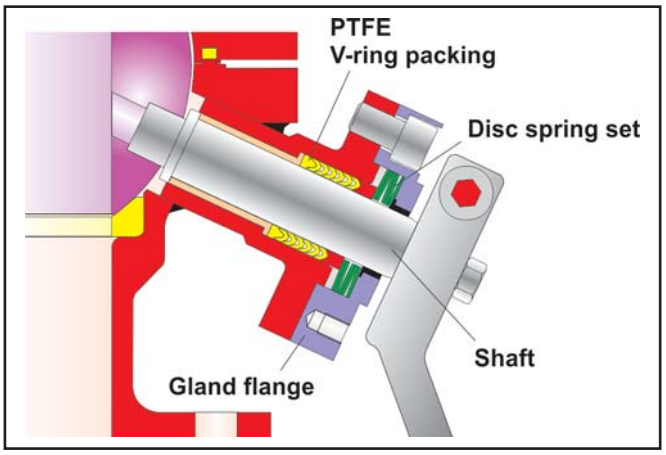

Fig. 5 – Live-loaded sealing system

- Maintenance-free and self-adjusting
- Highest tightness, even under extreme pressure and temperature conditions
- High durability
- ***All in all:***
  Extremely economic!

General technical data

Nominal size outlet	DN 50 to DN 150 as well as NPS2 to NPS6
Nominal pressure	PN 16 to PN 40 as well as ANSI cl150 / cl300
Temperature range	See Pressure-Temperature diagram
Ball sealing	TFM (PTFE)
Leakage rate	Leakage rate A acc. to DIN EN 12266-1, P12 (Leakage rate 1 BO acc. to DIN 3230 Part 3)
Flanges	All DIN-Versions, ANSI cl150 / cl300 on request
Packing	PTFE V-ring packing supported by disc springs

Table 2 - technical data

Materials

Body outlet	1.4571 / 1.4408
Body inlet	1.4571 / 1.4408
Ball	1.4408
Shaft	1.4571 / 1.4462
Seat rings	TFM (PTFE)
Disc springs	1.4404 covered by PTFE
Packing	PTFE V-ring packing with disc springs in 1.8159, Delta-Tone
Upper Bearing bush	PTFE with 25% carbon
Lower Bearing bush	PTFE with 25% glass
Body sealing	PTFE

Table 3 - Materials

Pressure-Temperature diagram

The area of application is determined by the pressure-temperature diagram. Process data and the process medium can affect the values in the diagram.

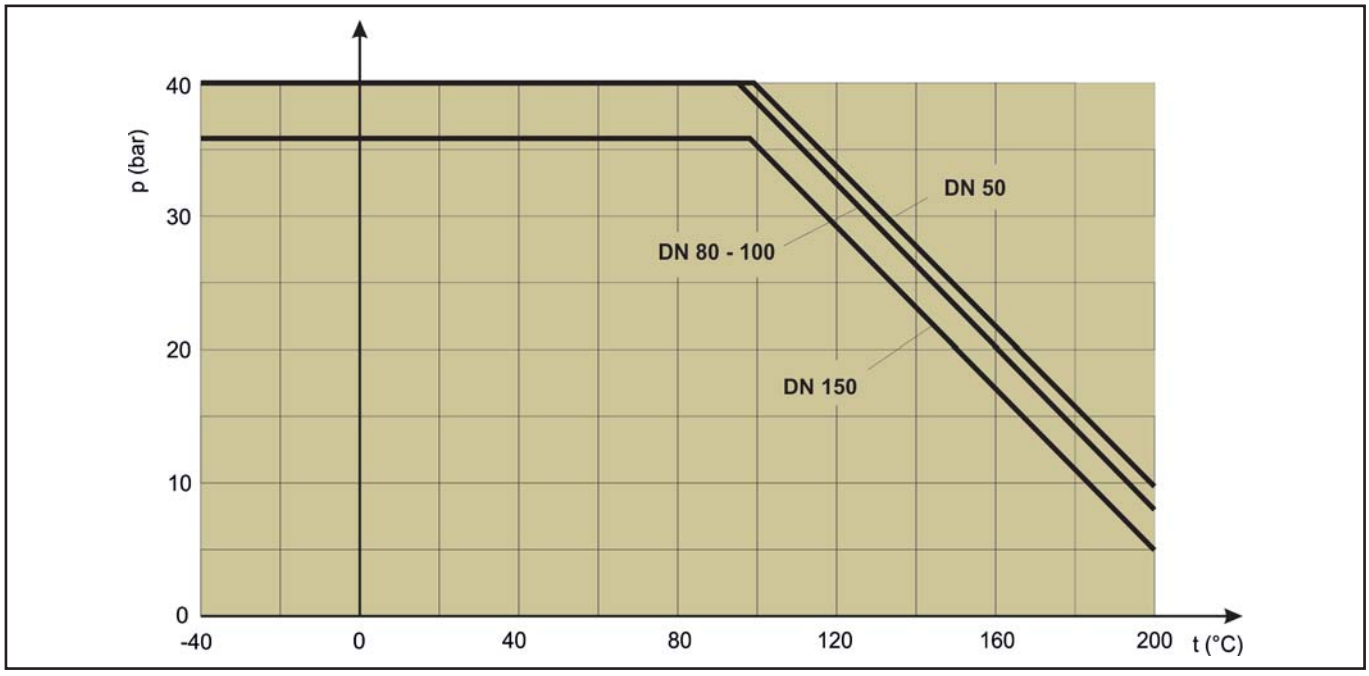

Fig. 6 - Pressure-Temperature diagram

Torque and breakaway torques

Differenzdruck Δp in bar			0	2	4	6	8	10
DN	zul. Drehmoment MDmax. in Nm	erf. Drehmoment Md in Nm	Losbrechmoment Mdl in Nm					
50 / 2“	134	20	30	34	39	43	48	52
80 / 3“	419	60	86	98	110	121	133	146
100 / 4“	577	95	138	157	176	195	214	233
150 / 6“	1435	190	270	309	349	387	427	467

Table 4 - max. permissible torque Mdmax., required torque Md and breakaway torque Mdl

The breakaway torques specified are average values which were measured with air at 20°C with the corresponding differential pressures. Operating temperature, process medium and long operating times may affect the permissible torques and breakaway torques.

Dimensions and weights

Standard types and further types are also possible acc. to the respective flange connection of the vessel

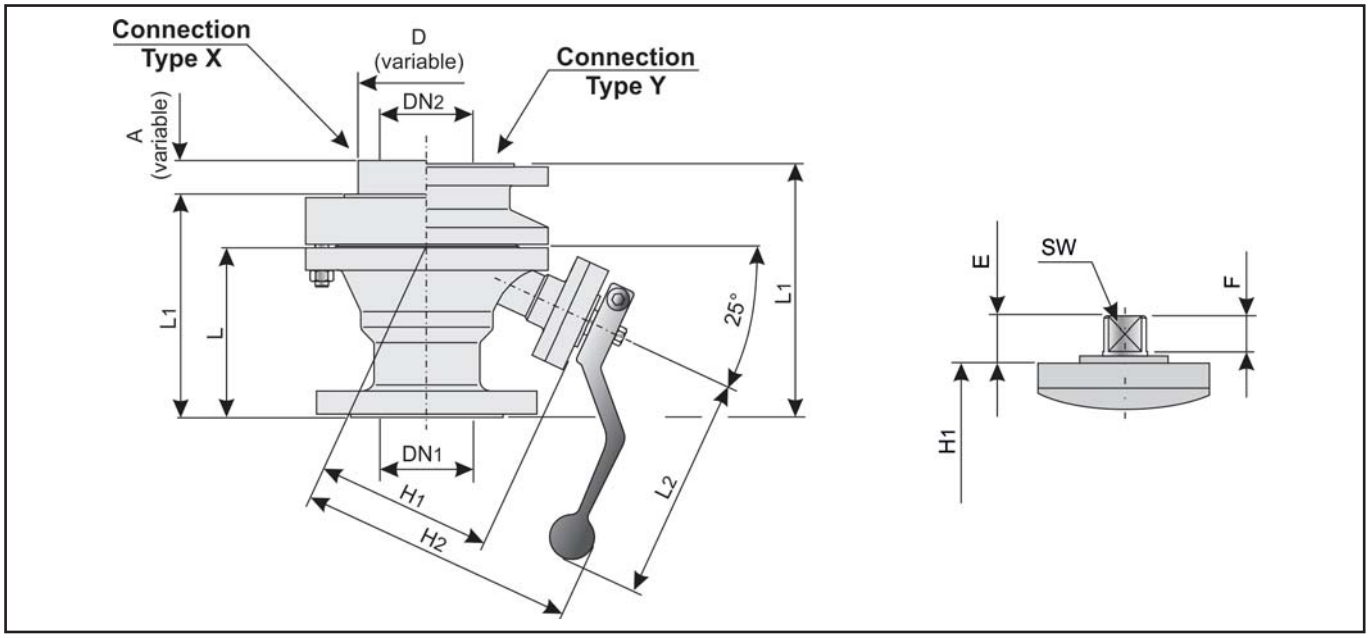

Fig. 7 - bottom drain ball valve

DN - outlet	50 / 2“				80 / 3“				100 / 4“			150 / 6“		
DN - inlet	50 2“	80 3“	100 4“	150 6“	80 3“	100 4“	150 6“	200 8“	100 4“	150 6“	200 8“	150 6“	200 8“	250 10“
Type	Y	X	X	X	Y	X	X	X	Y	X	X	Y	X	X
L	115				155				175			240		
L1	175	137	137	170	240	195	190	195	270	260	213	380	340	342
A (variable)	-	35	35	40	-	35	40	40	-	40	40	-	40	40
D (variable)	-	94	129	179	-	129	179	199	-	179	199	-	233	249
H1	130				158				179			246		
H2	183				225				232			-		
L2	220				365				365			-		
E	19				24				25			27		
F	12				16				16			24		
SW	12				16				16			24		
DIN ISO Connection	F05				F07				F07			F10		
Weight	20	17	17	19	36	36	35	38	51	43	45	105	112	150

Table 5 - Dimensions in mm and weights in kg

Valve sizes and body inlet sizes

Outlet		Inlet	
Nominal size	Nominal pressure	Nominal size	Body inlet
DN 50 / NPS2	PN 16 up to PN 40	DN 50 / NPS2	Type Y
		DN 80 / NPS3	Type X
		DN 100 / NPS4	Type X
		DN 150 / NPS6	Type X
DN 80 / NPS3	PN 16 up to PN 40	DN 80 / NPS3	Type Y
		DN 100 / NPS4	Type X
		DN 150 / NPS6	Type X
		DN 200 / NPS8	Type X
DN 100 / NPS4	PN 10 up to PN 16	DN 100 / NPS4	Type Y
		DN 150 / NPS6	Type X
		DN 200 / NPS8	Type X
DN 150 / NPS6	PN 10 up to PN 16	DN 150 / NPS6	Type Y
		DN 200 / NPS8	Type X
		DN 250 / NPS10	Type X

Table 5 - Valve sizes

Bottom drain ball valves with outlet sizes DN 25, DN 40 up to DN 300 as well as the ANSI-types can also be supplied. Details on request.

Selection and sizing of the ball valve

1. Calculation of the required nominal diameter
2. Selection of Type X or Type Y from Table 5
3. Selection of the valve in accordance with the Pressure-Temperature diagram
4. Selection of the appropriate actuator
5. Additional equipment

Note:
All relevant details regarding the version ordered, which deviate from the specified version in this technical description data, can be taken if required, from the corresponding order confirm.

Associated data sheets

- For Quarter-turn actuators **TB 31a**

Ordering text

Bottom drain ball valve BR 22a,

DN . . . . / PN . . . . , Type . . . .

Optional special version

Manual gear actuator or actuator (brand name): . . . .

Supply pressure: . . . . bar

Fail-safe position: . . . .

Limit switch (brand name): . . . .

Solenoid valve (brand name): . . . .

Positioner: . . . .

Others: . . . .

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