

BR 22a · Stainless steel Bottom Drain Ball Valve With tilted shaft · DIN and ANSI Version



Application

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

- **Nominal size DN 25 to 200 and NPS2 to 8**
- **Nominal pressure PN 10 to 40 as well as cl150 and cl300**
- **Temperatures -10 °C to +200 °C (14 °F to 392 °F)**

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 particularly small leakage rate
- Body, Ball and shaft in stainless steel or special materials
- Exchangeable seat rings.
- Control shaft sealing by spring-loaded V-ring packing
- Particularly small installation lengths
- Straight flow
- Connections according to DIN ISO 5211

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
(for details see respective data sheet).

Special designs

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

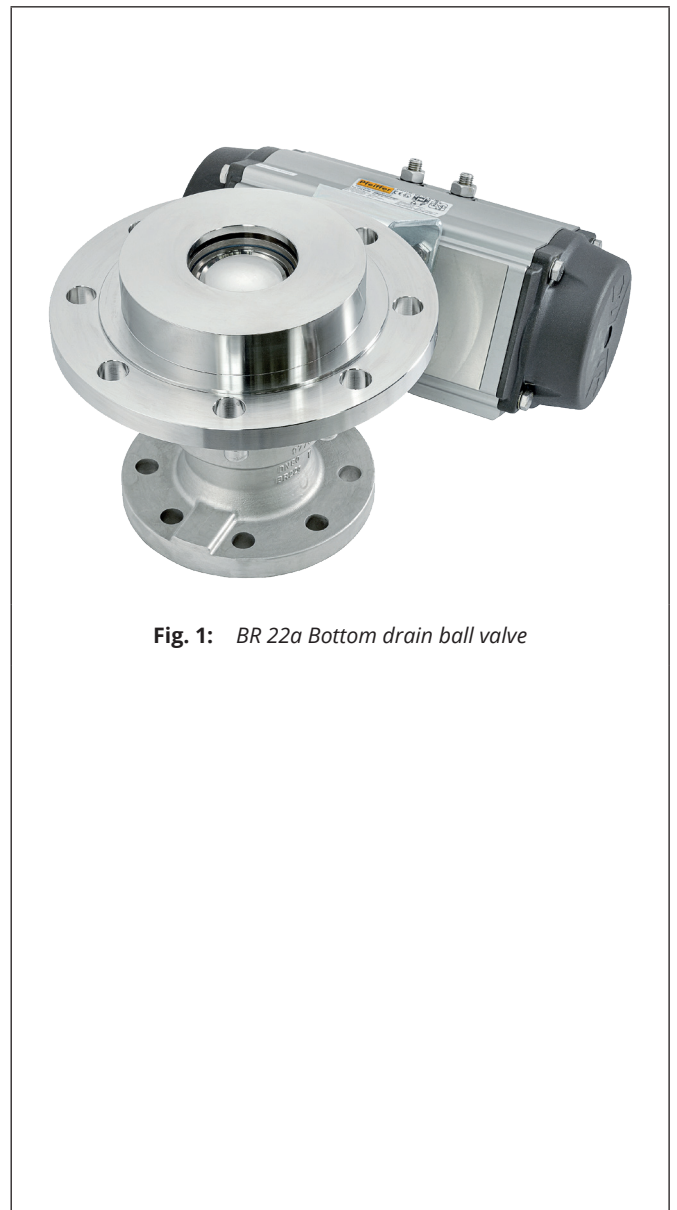


Fig. 1: BR 22a Bottom drain ball valve

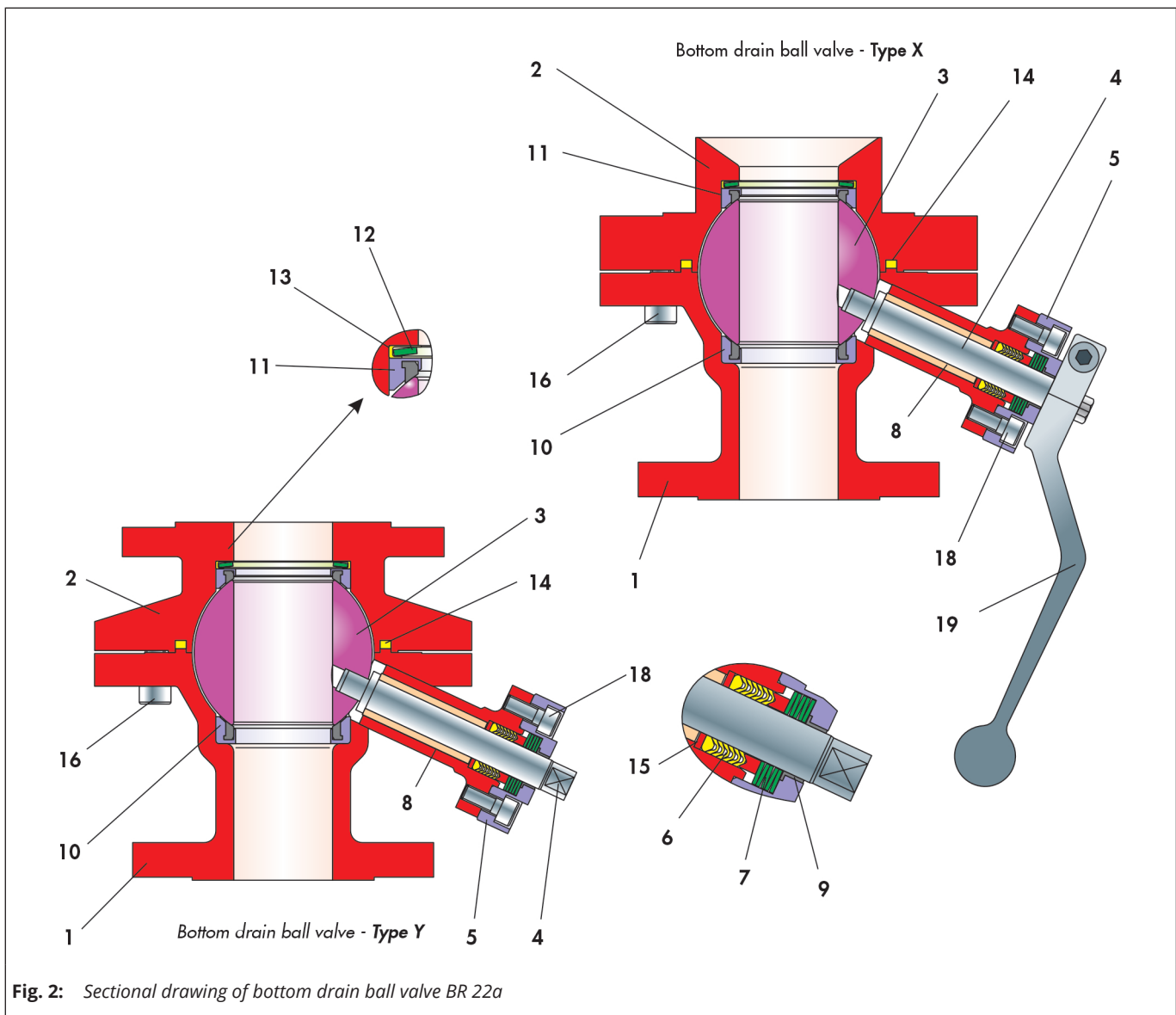


Table 1: List of parts

Item	Description
1	Main body
2	Flange-on body
3	Ball
4	Control shaft
5	Stuffing box flange
6	V-ring packing
7	Disc spring set
8	Bearing bush
9	Bearing bush
10	Seat ring

Item	Description
11	Seat ring
12	Disc spring
13	Disc spring jacket
14	Sealing
15	Disc
16 ¹⁾	Stud bolt /Screw
17 ¹⁾	Nut
18	Screw
19	Lever

¹⁾ Depending on the nominal size, stud bolts with nuts or screws can be used

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 ball (3) has a cylindrical passage and runs on bearings with an inclination of 25° towards the joint between flange-in body and main body.

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

Ball sealing is provided by exchangeable seat rings (10 and 11).

The ball shaft is sealed by a PTFE V-ring packing (6).

This self-adjusting packing is preloaded by disc springs (7) located above the packing and needs no maintenance.

The control shaft (4) can either be coupled with a pneumatic actuator via an adapter or be equipped with a lever (19).

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 particular 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.

Info

Please, pay attention to the usability according to the ATEX 2014/34/EU in correspondence to the mounting and operating instruction ► EB 22a before using the ball valve in hazardous area!

Failure position

Depending on the mounting of the pneumatic actuator, the bottom drain ball valve has two fail-safe positions that are activated when the pressure is released as well when the supply air fails:

- **Bottom drain ball valve with fail-close actuator [FC]:**

Upon air failure, the ball valve is closed.

The bottom drain ball valve opens when the signal pressure increases, acting against the force of the springs.

- **Bottom drain ball valve with fail-open actuator [FO]:**

Upon air failure, the ball valve is opened.

The bottom drain ball 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).

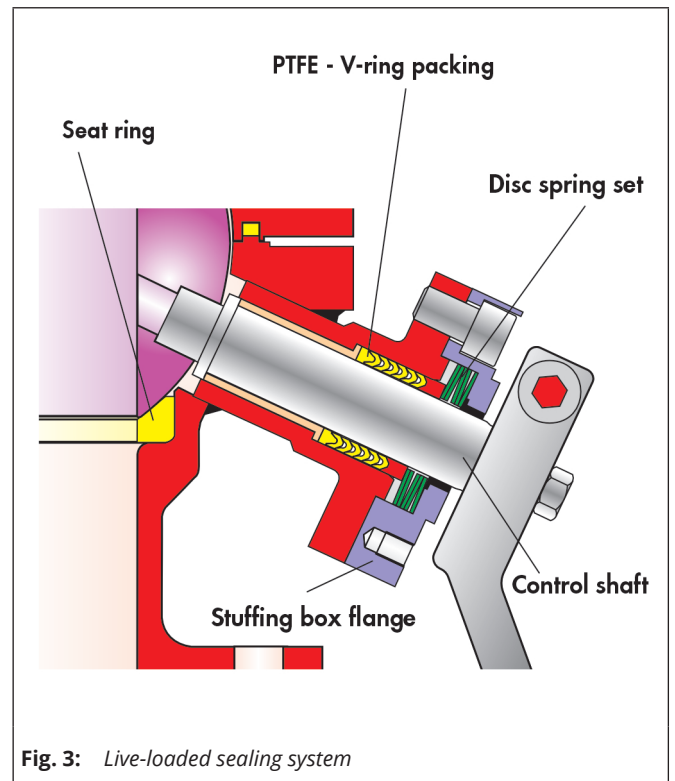
Additional equipment and accessories

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

- Shaft extension (100 mm standard)
- Pneumatic and electric quarter-turn actuators
- Positioner
- Limit switches
- Solenoid valves
- Filter regulator

Further accessories are available on request for customer specifications

Advantages of the live-loaded sealing system



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

Table 2: General technical data

	DIN	ANSI
Nominal size outlet	DN 25 ... 200	NPS2 ... 8
Nominal pressure	PN 10 ... 40	cl150 ... cl300
Temperature range	-10 °C ... +200 °C (14 °F ... 392 °F)	
Ball sealing	PTFE	
Leakage rate	Leakage rate A according to DIN EN 12266-1, P12	
Flanges	All DIN-Versions, ANSI cl150 / cl300 on request	
Packing	PTFE V-ring packing supported by disc springs	

Table 3: Materials

	DIN	ANSI
Main body	1.4571 / 1.4408	A182 F316Ti / A351 CF8M
Flange-on body	1.4571 / 1.4408	A182 F316Ti / A351 CF8M
Ball	1.4408	A351 CF8M
Control shaft	1.4462	A182 Gr. F51
Seat rings	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 4: Torque and breakaway torques

		Pressure difference Δp in bar		0	2	4	6	8	10
Nominal size	DN NPS	Max. Permissible torque MD _{max.} in Nm	Required torque Md in Nm	Breakaway torques Mdl in Nm					
25	-	204	9	13	14	15	16	17	18
50	2	204	20	30	34	39	43	48	52
80	3	612	60	86	98	110	121	133	146
100	4	998	95	138	157	176	195	214	233
150	6	3992	190	270	309	349	387	427	467
200	8	5339	378	540	592	644	696	748	800

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.

Table 5: *kvs* and *Cv* coefficients

Nominal size	DN	25	50	80	100	150	200
	NPS	-	2	3	4	6	8
<i>kvs</i>		49	178	422	610	1575	2810
<i>Cv</i>		57	207	491	709	1830	3260

Pressure-temperature table for DIN bottom drain ball valves

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

Body material: 1.4408 / 1.4571 (DIN EN 1092-1)

Sealing ring material: M-PTFE / PTFE

Table 6: *Pressure-temperature values*

Standard		-10°C ... 200°C												
Nominal pressure	Nominal size	Temperature in °C												
		-10	0	20	40	60	80	100	120	140	160	180	200	
PN 16	DN 25 ... 50	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.9	15.7	15.5	15.2	10.0	Pressure in bar
	DN 80 ... 100	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.9	15.7	15.5	13.4	8.0	
	DN 150 ... 200	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.9	15.7	15.5	10.6	5.0	
PN 40	DN 25 ... 50	40.0	40.0	40.0	40.0	40.0	40.0	40.0	34.0	28.0	22.0	16.0	10.0	
	DN 80 ... 100	38.0	38.0	38.0	38.0	38.0	38.0	35.0	29.6	24.2	18.8	13.4	8.0	
	DN 150 ... 200	36.0	36.0	36.0	36.0	36.0	36.0	33.2	27.5	21.9	16.3	10.6	5.0	

Pressure-temperature table for ANSI bottom drain ball valves

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

Body material: A351-CF8M / A182 F316Ti (ASME B16.34 / ASME B16.5)

Sealing ring material: M-PTFE / PTFE

Table 7: *Pressure-temperature values*

Standard		-10°C ... 200°C											
Nominal pressure	Nominal size	Temperature in °C											
		-10	0	20	40	60	80	100	120	140	160	180	200
cl150	NPS2	19.0	19.0	19.0	19.0	17.9	17.0	16.2	15.6	15.0	14.6	14.1	10.0
	NPS3 ... 4	19.0	19.0	19.0	19.0	17.9	17.0	16.2	15.6	15.0	14.6	13.4	8.0
	NPS6 ... 8	19.0	19.0	19.0	19.0	17.9	17.0	16.2	15.6	15.0	14.6	10.6	5.0
cl300	NPS2	40.0	40.0	40.0	40.0	40.0	40.0	40.0	34.0	28.0	22.0	16.0	10.0
	NPS3 ... 4	38.0	38.0	38.0	38.0	38.0	38.0	35.0	29.6	24.2	18.8	13.4	8.0
	NPS6 ... 8	36.0	36.0	36.0	36.0	36.0	36.0	33.2	27.5	21.9	16.3	10.6	5.0

Dimensions and weights

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

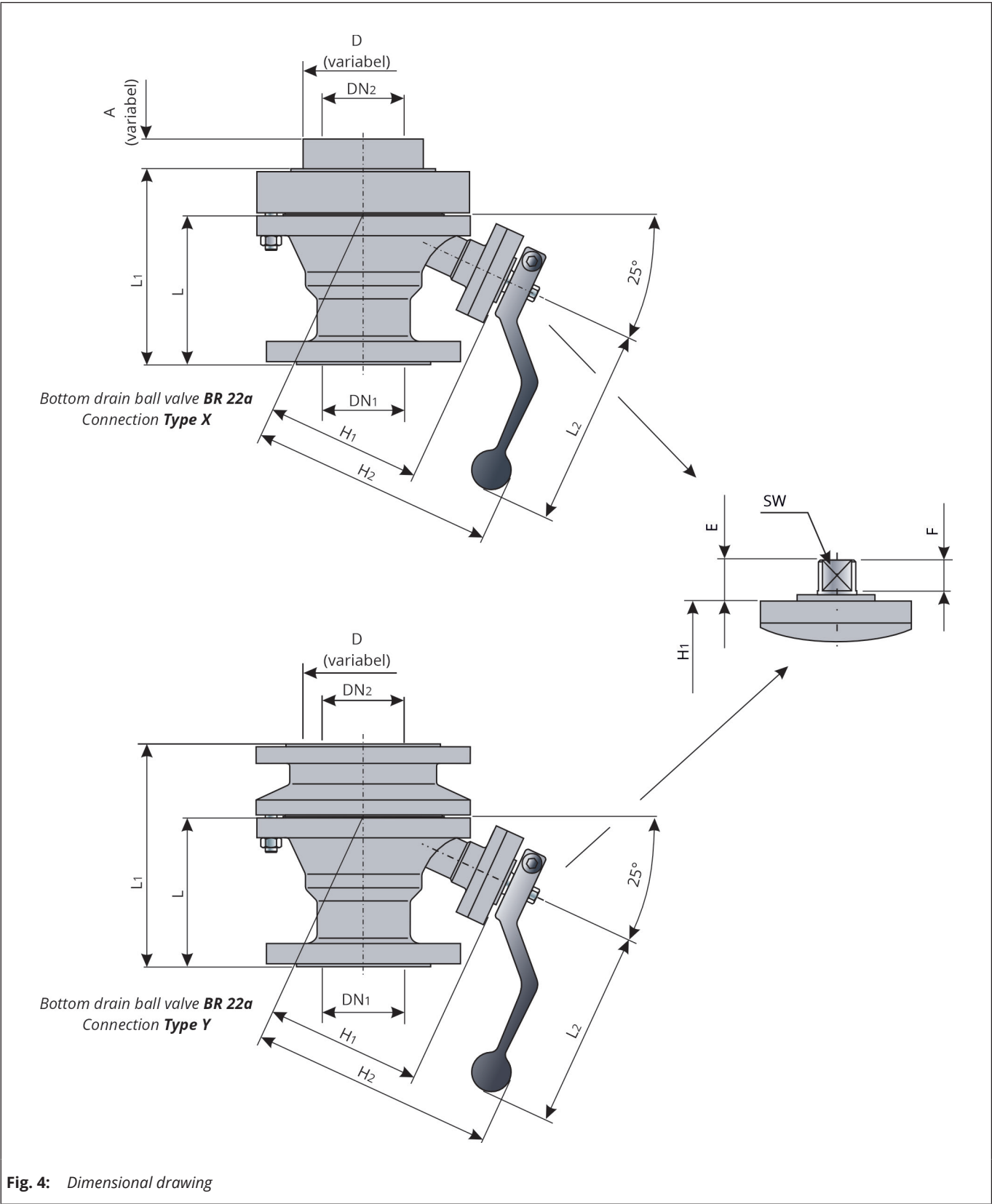


Table 8: Dimensions in mm and weights in kg

Outlet DN ₁	DN	25		50				80				100			150			200		
	NPS	-		2				3				4			6			8		
Inlet DN ₂	DN	25	25	50	80	100	150	80	100	150	200	100	150	200	150	200	250	200	250	300
	NPS	-	-	2	3	4	6	3	4	6	8	4	6	8	6	8	10	8	10	12
Type		Y	X	Y	X	X	X	Y	X	X	X	Y	X	X	Y	X	X	Y	XY	XY
L		96.7		115				155				175			240			227		
L ₁		121.5	110	175	137	137	170	240	195	190	195	270	250	213	380	340	342	400	400	400
A (variable)		-	12.5	-	35	35	40	-	35	40	40	-	40	40	-	40	40	-	42	42
D (variable)		-	59.8	-	94	129	179	-	129	179	199	-	179	199	-	233	249	-	249	299
H ₁		120		130				158				179			268			320		
H ₂		182.5		183				225				232			-			-		
L ₂		165		220				365				365			-			-		
E		18		19				24				26			37			38		
F		12		12				16				19			30			30		
SW		12		12				16				19			30			30		
DIN ISO connection		F05		F05				F07				F10			F14			F14		
Weight		6.8	5.8	20	17	17	19	36	36	35	38	51	43	45	105	112	150	240	230	250

Table 9: Valve sizes and body inlet sizes

Outlet				Inlet		
DIN		ANSI		Nominal size		Connection
Nominal size	Nominal pressure	Nominal size	Nominal pressure	DIN	ANSI	
DN 25	PN 16 ... 40	-	-	DN 25	-	Form X
				DN 50	-	Form Y
DN 50	PN 16 ... 40	NPS2	cl150 / cl300	DN 50	NPS2	Form Y
				DN 80	NPS3	Form X
				DN 100	NPS4	Form X
				DN 150	NPS6	Form X
DN 80	PN 16 ... 40	NPS3	cl150 / cl300	DN 80	NPS3	Form Y
				DN 100	NPS4	Form X
				DN 150	NPS6	Form X
				DN 200	NPS8	Form X
DN 100	PN 10 ... 16	NPS4	cl150	DN 100	NPS4	Form Y
				DN 150	NPS6	Form X
				DN 200	NPS8	Form X
DN 150	PN 10 ... 16	NPS6	cl150	DN 150	NPS6	Form Y
				DN 200	NPS8	Form X
				DN 250	NPS10	Form X
DN 200	PN 10 ... 40	NPS8	cl150	DN 200	NPS8	Form Y
				DN 250	NPS10	Form XY
				DN 300	NPS12	Form XY

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

Selection and sizing of the Bottom Drain 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

Ordering text

Bottom drain ball valve Type: BR 22a,
Nominal size: DN/NPS
Nominal pressure: PN/cl
Type: X/Y
Optional special version:

Actuator (brand name):
Supply pressure: bar
Fail-safe position:

Limit switch (brand name):
Solenoid valve (brand name):
Positioner:
Others:

Associated documents

- Associated Mounting and Operating Instructions ▶ EB 22a
- Associated Safety Manual ▶ SH 26
- For pneumatic actuators ▶ TB 31a



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.