



## BR 28t · Piggable 3-way Ball Valve

Ball valve in horizontal version · DIN and ANSI Version



### Applications

Tight-closing 3-way ball valve made of stainless steel for aggressive media, especially with high process demand in chemical plants:

- **Nominal diameter DN 50 to 200 and NPS2 to 8**
- **Nominal pressure PN 25 to 40 as well as cl150 and cl300**
- **Temperatures -10 °C to +200 °C (14 °F to 392 °F)**

The 3-way ball valve consists of a ball valve and a pneumatic part-turn actuator, manual gear or manually operated lever.

The ball valves, which are designed in the modular construction, have the following features:

- Horizontal version with horizontal third outlet
- Horizontal 3-way version with T-port
- With trunnion-mounted ball
- 90° operation
- Exchangeable port seal made of PTFE
- Control shaft, sealed with a V-ring packing, pre-loaded with disc spring set
- Blowout-proof shaft
- Piggable flanges in the passage of the ball valve to DIN 2430-2 with projection. Non-piggable flanges are designed in accordance with DIN EN 1092-1 with sealing strip B1 or according to customer-specific requirements.
- Connections for actuators according to DIN ISO 5211

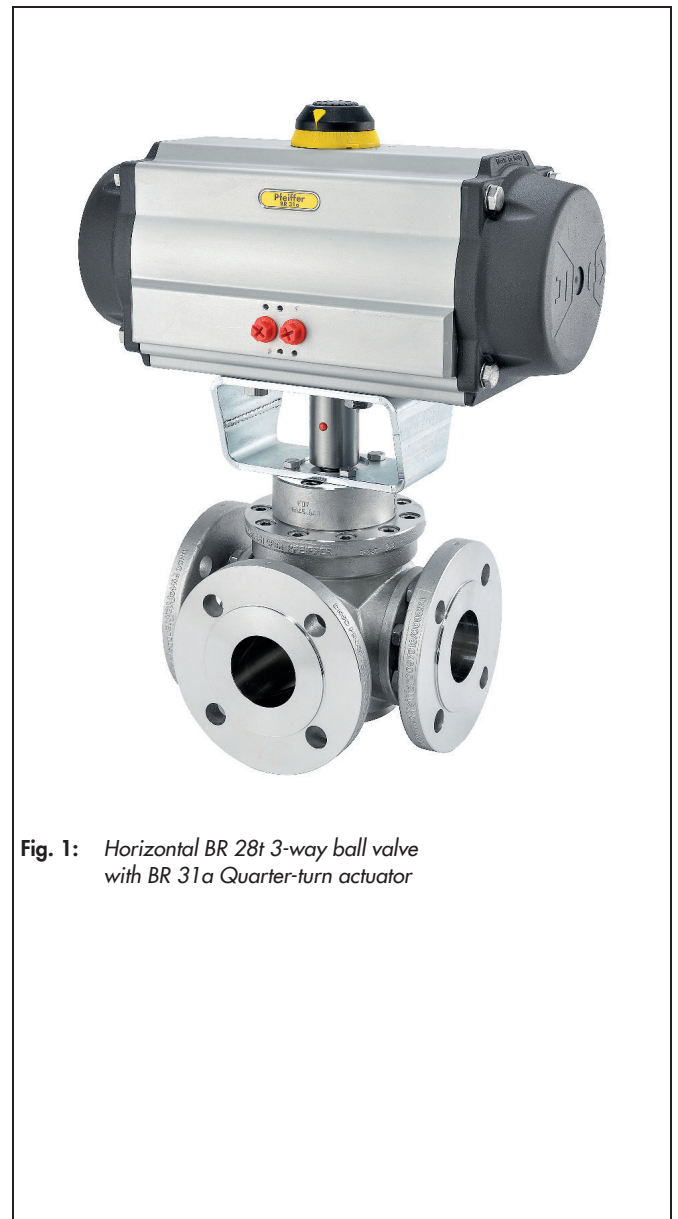
### Version

3-way ball valve optionally in the following versions:

- Ball valve with lever
- Ball valve with manual gear
- Ball valve with pneumatic part-turn actuator (refer to the corresponding data sheet for more details)

### Special versions

- Special flange version at inlet "C"
- Cavity minimized
- Heating jacket
- Pigging signal strip



**Fig. 1:** Horizontal BR 28t 3-way ball valve with BR 31a Quarter-turn actuator

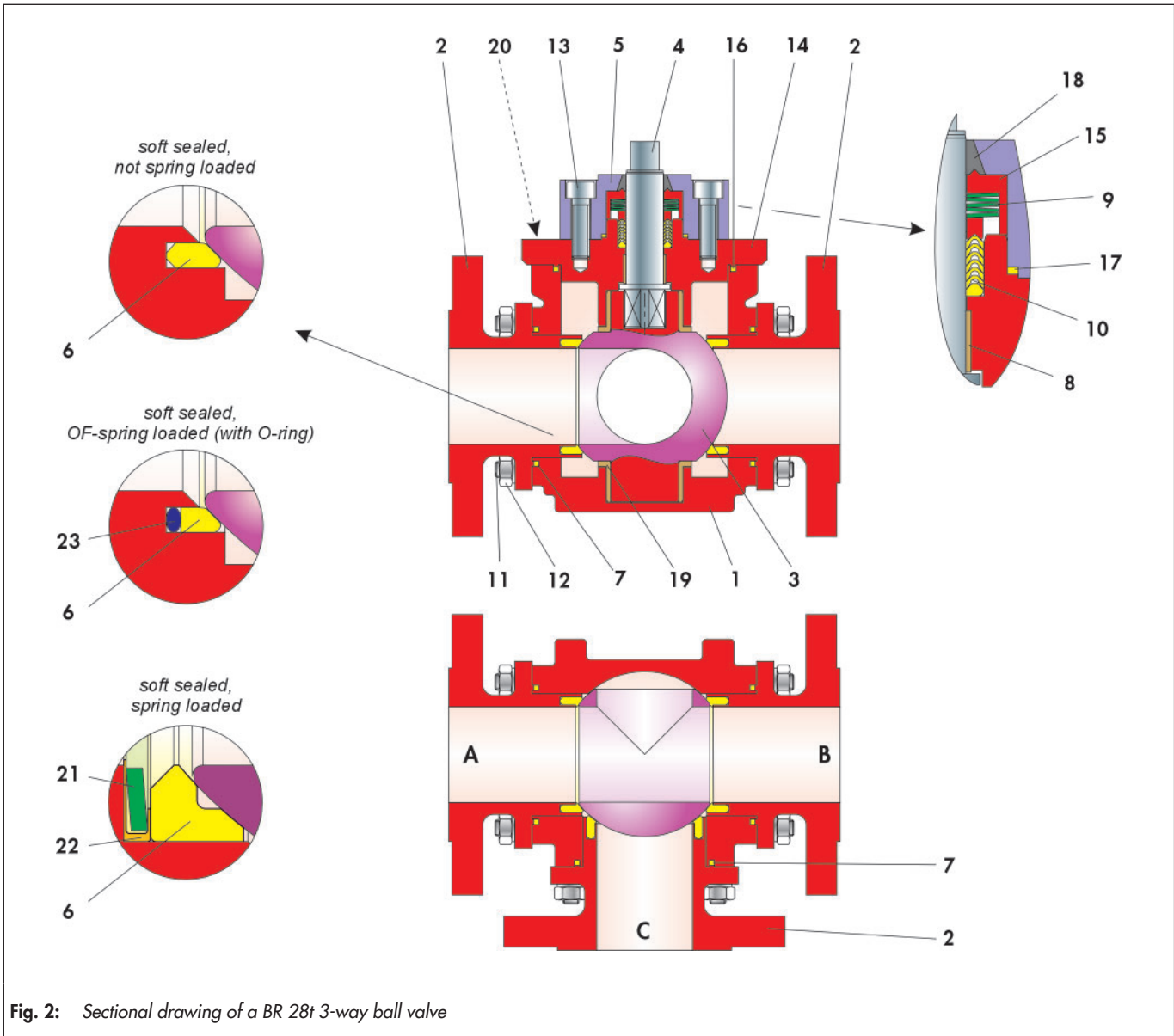


Fig. 2: Sectional drawing of a BR 28t 3-way ball valve

Table 1: List of parts

Item	Description
1	Main body
2	Body flange
3	Ball
4	Control shaft
5	Stuffing box flange
6	Seat ring
7	Sealing
8	Bearing bush
9	Disc spring set
10	V-ring packing
11 <sup>1)</sup>	Stud bolt / Screw
12 <sup>1)</sup>	Nut

Item	Description
13	Screw
14	Packing bush
15	Bushing
16	Ring
17	Ring
18	Ring
19	Bearing bush
20	Screw
21	Disc spring
22	Disc spring jacket
23	O-ring

<sup>1)</sup> Depending on the nominal width, stud bolts can be fitted with nuts or screws.

## Additional equipment and add-on pieces

The following accessories are available either individually or in combination for the ball valves:

- Shaft extension (100 mm standard)
- Pneumatic and electric part-turn actuators
- Limit switches
- Solenoid valves
- Positioners
- Air pressure reducing stations with filters

Further accessories are available on request for customer specifications.

## Principle of operation

The process medium can flow through the full port in the BR 28t 3-way ball valves.

The ball (3) slew around the control shaft (4).

The opening angle of the ball determines the flow rate across the free area between the main body (1) and the body flange (2). Possible flow pattern configurations are described on the next page.

The ball (3) is sealed by of exchangeable seat ring (6). The Control shaft is sealed with a maintenance free PTFE - V-packing (10), which is pre-loaded by a disc spring set (9) located above the packing.

The control shaft (4) is fitted with a lever.

Optionally, a pneumatic actuator or a manual gear can be fitted.

### **i** Info

Before using the 3-way ball valve in hazardous areas, check whether this is possible according to ATEX 2014/34/EU. See Mounting and operating Instructions ► EB 28t.

## Fail-safe position

Depending on how the pneumatic actuator is mounted to the valve, the 3-way ball valve has two fail-safe positions which become effective when the air pressure in the actuator is relieved or when the supply air fails.

The position of the ball is to be determined accordingly.

- **3-way ball valve with actuator “on failure closing”**  
On failure of air supply, the ball valve is closed to the outside and the piggable passage is open.  
The opening of the 3-way ball valve accrues on rising of air supply against the force of the springs.
- **3-way ball valve with actuator “Stop”**  
On failure of air supply, the ball valve remains in its position.

## Flow patterns

The layout and the switching functions of the actuator are variable.

The 3-way valves are designed and equipped according to specific customer requirements.

Detailed specifications regarding the control and safety positions can be found in the Mounting and operating instructions

► EB 28t.

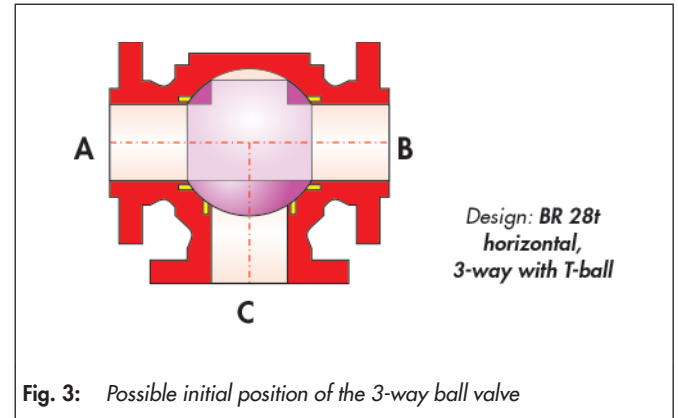


Fig. 3: Possible initial position of the 3-way ball valve

## Advantages of spring supported sealing system

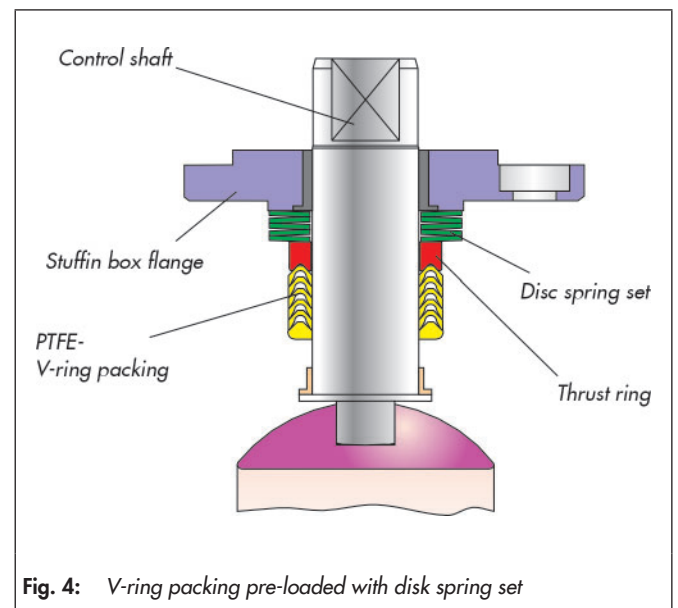


Fig. 4: V-ring packing pre-loaded with disk spring set

- Maintenance-free and self-adjusting
- Highest level of sealing, even under extreme pressure and temperature fluctuations
- Longer service life
- Reduced increase in torque at rising temperatures, therefore requiring smaller actuators for automation
- Sealing to atmosphere acc. to TA-Luft
- **All in all: extremely economic!**

**Table 2:** General technical data

	DIN	ANSI
Nominal size	DN 50 ... 200	NPS2 ... 8
Nominal pressure	PN 25 ... 40	cl150 ... 300
Temperature range	-10 °C ... 200 °C (14 °F ... 392 °F)	
Ball sealing	PTFE	
Leakage rate	Leakage rate A acc. to DIN EN 12266-1, P12	
Flange	DIN 2430-2 (V) / DIN EN 1092-1 and ANSI B16.5	DIN 2430 / ASME B16.5
Face to face	DIN EN 558, series 1 (DIN 3202, F1)	
Permissible working pressure	See Pressure-Temperature diagram	

**Table 3:** Materials

	DIN	ANSI
Main body	1.4571 / 1.4408	A182 F316 / A351 CF8M
Body flange	1.4571 / 1.4408	A182 F316 / A351 CF8M
Ball	1.4571 / 1.4408	A182 F316 / A351 CF8M
Control shaft	1.4462	ASTM A182 Gr. F51
Seat rings	PTFE	
Packing	PTFE V-ring packing with disc springs in 1.8159, Delta Tone	
Lower bearing bush	PTFE with 25% glass	
Upper bearing bush	PTFE with 25% carbon	
Body sealing	PTFE	

## Torque and breakaway torque

**Table 4:** Torque and breakaway torque

Pressure difference		$\Delta p$ in bar	0	10	16	25	40	
Nominal diameter		M <sub>dmax.</sub> in Nm	Breakaway torque M <sub>dl</sub> in Nm					
DN	NPS							
50	2	645	50	86	110	142	200	
80	3	998	140	236	292	380	524	
100	4	998	220	370	460	594	766	
125	5	On request						
150	6	4201	460	796	996	1300	1800	
200	8	On request						

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 periods may affect the permissible torque and breakaway torque.

## Dimensions and weights

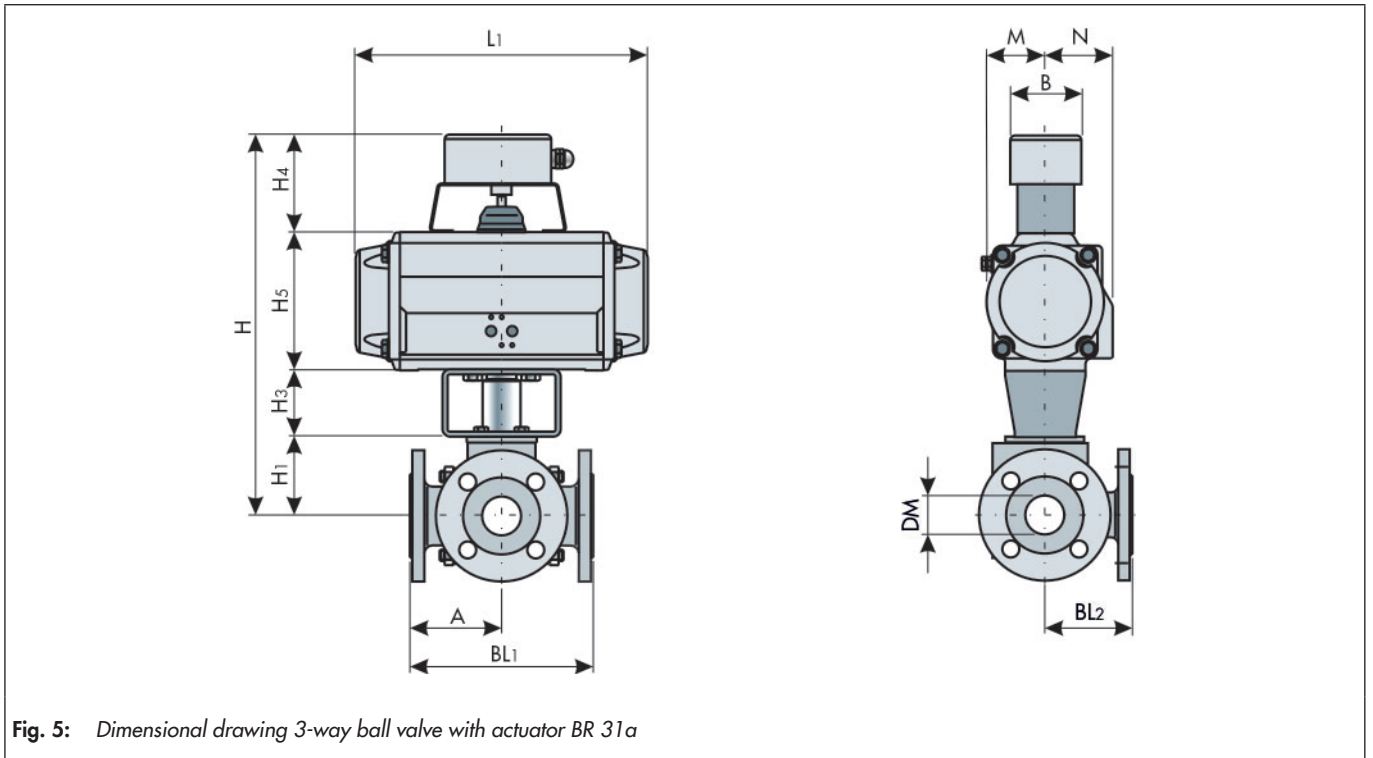


Fig. 5: Dimensional drawing 3-way ball valve with actuator BR 31a

Table 5: Dimensions in mm and weights in kg

Nominal size	DN 50	DN 80	DN 100	DN 125	DN 150	DN 200	
	NPS2	NPS3	NPS4	NPS5	NPS6	NPS8	
DM	54.5	82.5	107.1	On request	159.3	206.5	
BL1	DIN	230	310		480	600	
	ANSI	292	356		559	660	
BL2	DIN	115	155		175	240	300
	ANSI	146	178		216	279.5	330
A	DIN	115	155		175	240	300
	ANSI	146	178		216	279.5	330
H1	100	136	156		221	221	
Actuator SRP / DAP	150	220	300		450	900	
H	H1 + H3 + H4 + H5						
H3	60	80	80	On request	80	80	
H4	110	110	110		110	110	
B	80	80	80		80	80	
DIN ISO connection	F05	F07	F07		F12	F14	
Weight in kg	25	40	55		105	176	

Actuator SRP / DAP	150	220	300	450	900
L1	259	304	333	394.5	474
H5	127	145	157	177	220.5
M	55.5	64	69.5	80	99
N	63	72	77	86	101
Weight in kg SRP	6.5	9.8	12.6	18.1	31.6

## Pressure-temperature diagram

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

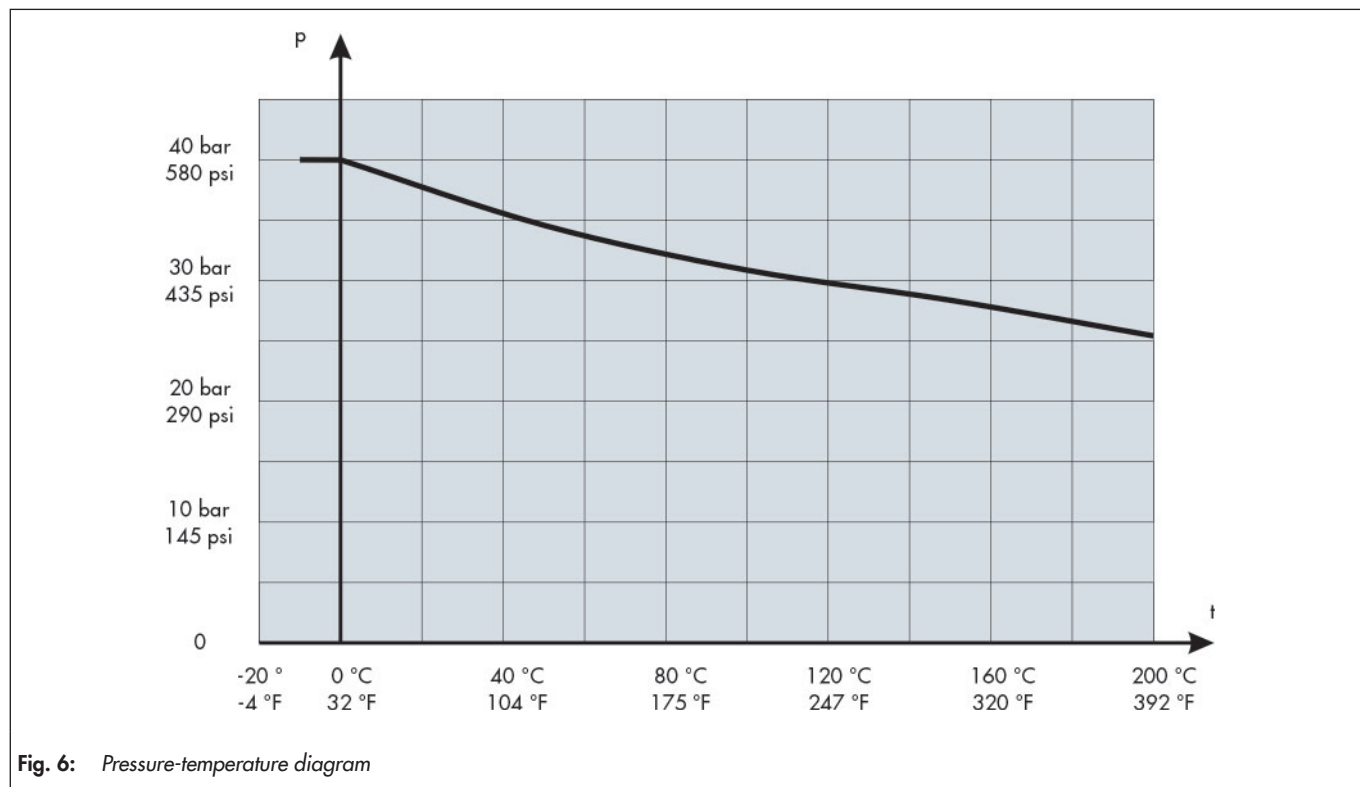


Fig. 6: Pressure-temperature diagram

### Selection and sizing of the pig loading ball valve

1. Determine the nominal diameter
2. Determine the flow pattern
3. Select valve using Table 2, Table 3 and the Pressure-Temperature diagram
4. Select the actuator acc. table 5
5. Select additional equipment / accessories

### Associated documents

- Associated Mounting and Operating Instructions ▶ EB 28t
- Associated Safety Manual ▶ SH 28t
- For pneumatic actuators ▶ EB 31a

#### **i** Info

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 confirmation.

### Ordering text

Piggable 3-way Ball valve Type: BR 28t  
 Nominal size: DN/NPS. ....  
 Nominal pressure: PN/Class ....  
 Optional special version: ....  
 Actuator (brand name): ....  
 Supply pressure: .... bar  
 Fail-safe position: ....  
 Limit switch (brand name): ....  
 Solenoid valve (brand name): ....  
 Positioner (brand name): ....  
 Others: .....