



## BR 14t · Triple eccentric Control and Shut-off Butterfly valve DIN and ANSI-Version



### Applications

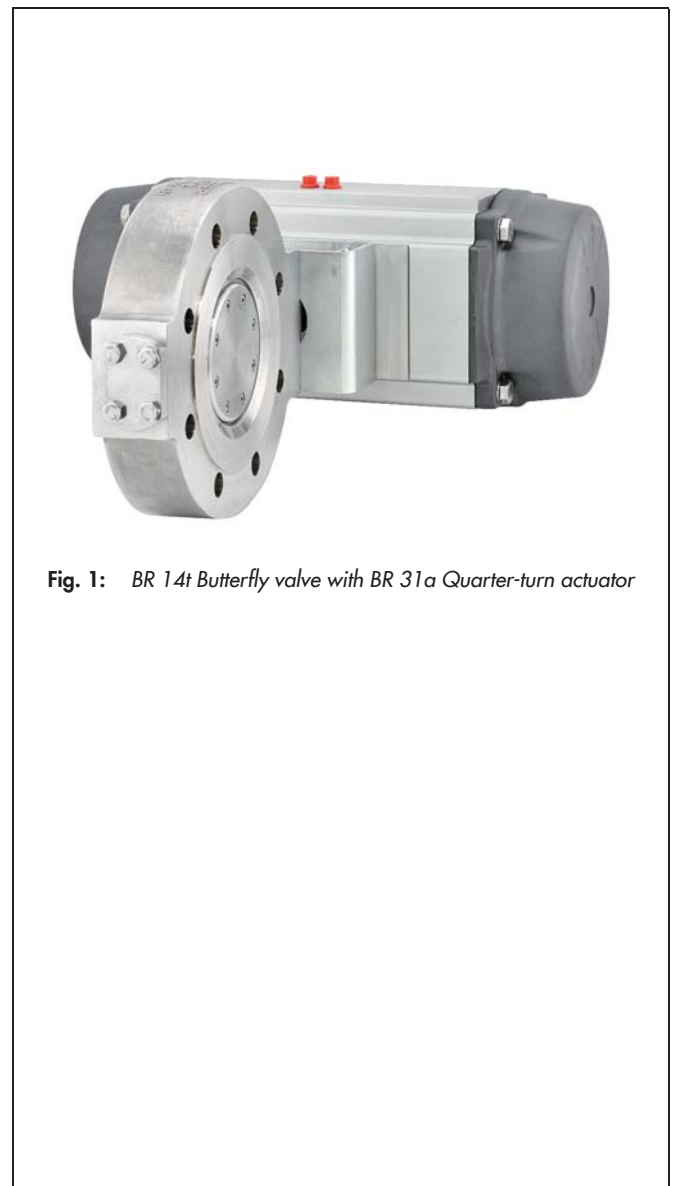
Triple eccentric butterfly valve providing excellent shut-off in all industrial applications:

- **Nominal size DN 80 to DN 400 and NPS3 to NPS16**
- **Nominal pressure PN 10 to PN 40 as well as cl150 and cl300**
- **Temperatures -196°C to 550°C**

In addition to its use with the process media in chemical applications, the BR 14t Butterfly valve is used in the petrochemical industry, refineries and power plants.

The one-pieced body has the following special features:

- **Body versions**
  - Lug-type
  - Wafer-type
- **Seat and seat ring versions**
  - Type Standard
  - Type Double Seat
  - Type Single Seat
- **Valve body**
  - Steel
  - Stainless steel or
  - Special materials
- **Further features**
  - Self centering seat ring
  - Optimal positioning of the bearing
  - TA-Luft
  - Fire-safe, bi-directional acc. to API 607 4th ed.
  - Vacuum-proof
  - Blowout-proof shaft
  - Feather key connection for torque transmission
  - Face-to-face dimensions acc. to DIN EN 558, Series 16
  - Face-to-face dimensions acc. to API 609 cl150 and 300
  - Mounting options acc. to DIN ISO 5211.
- **Scope of application**
  - Hot gases
  - Cryogenic liquids
  - Steam (saturated steam and superheated steam)
  - Hydrocarbons
  - Other process media



**Fig. 1:** BR 14t Butterfly valve with BR 31a Quarter-turn actuator

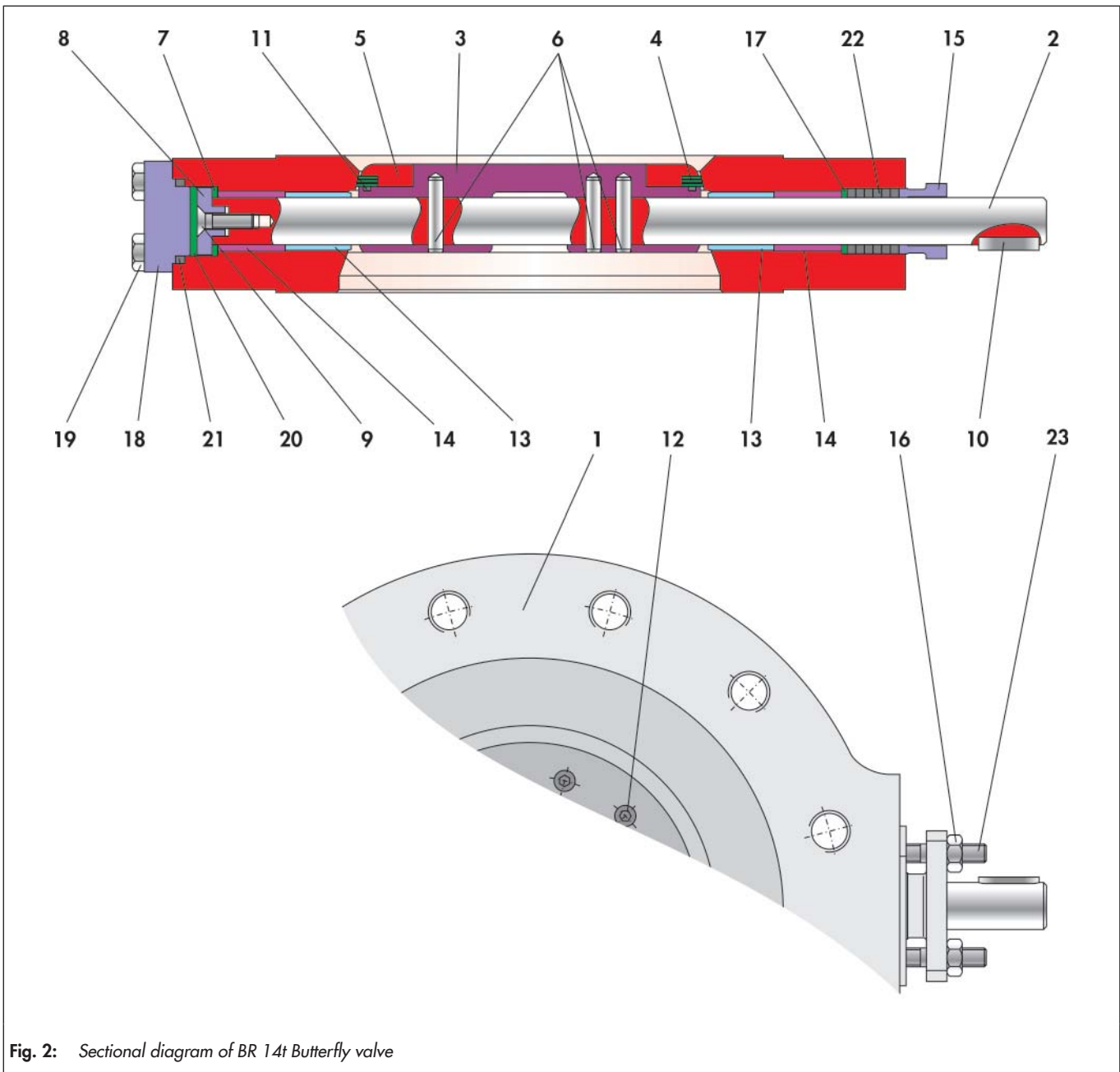


Fig. 2: Sectional diagram of BR 14t Butterfly valve

Table 1: Parts list

Item	Description
1	Valve body
2	Valve shaft
3	Butterfly disc
4	Seat ring
5	Fastening ring
6	Straight pin
7	Guide washer
8	Shaft head

Item	Description
9	Screw
10	Feather key
11	Graphite-Ring
12	Screw
13	Bearing bushing
14	Spacer
15	Stuffing box
16	Screw

Item	Description
17	Thrust washer
18	Bonnet
19	Screw
20	Counter washer
21	Graphite-ring
22	Graphite-packing
23	Stud bolt

## Versions

The BR 14t Butterfly Valve is available in the following versions depending on the desired valve size:

- Hand-operated butterfly valve with handwheel
- Butterfly valve with pneumatic actuator
- Butterfly valve with electric actuator

## Special versions

- Laminated seals completely of stainless steel,
- PTFE laminated seals
- Stellite seat
- Cavity-free bearing
- Special materials
- For cryogenic applications
- For high-temperature applications

## Accessories

The following accessories are available either separately or in combination:

- Positioner
- Limit switches
- Solenoid valves
- Supply pressure regulators
- Pressure gauge build-on blocks

Further accessories can be provided to meet customer specifications. Details on request.

The BR 14t Butterfly valve has a triple offset geometry thanks to its special design:

- **1. First offset:**  
The shaft is slightly offset on one side to the centre line of the pipeline.
- **2. Second offset:**  
The shaft is arranged behind the seat axis.
- **3. Third offset:**  
The axis of the seat cone angle is offset from the centre line of the pipeline or valve.  
In this way, any friction or tendency of the seat ring to wedge on the seat is eliminated over the whole angle of rotation.

The position of the butterfly disc ( 3 ) determines the area of flow released across the seat.

Tight shut-off is ensured by the seat ring ( 4 ) that seals the seat.

The shaft ( 2 ) is sealed by a graphite packing ( 22 ).

The packing can be reloaded by the stuffing box ( 15 ) located above the packing chamber.

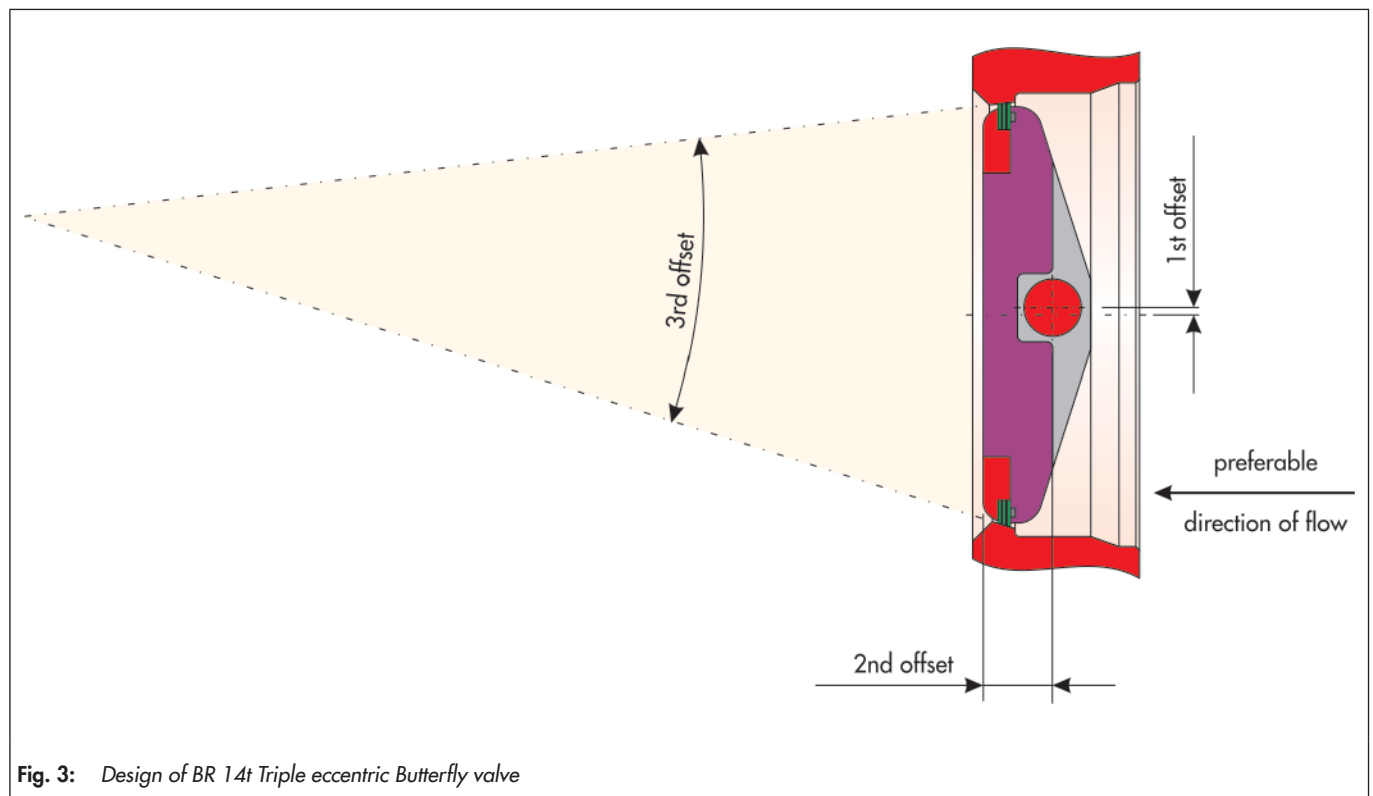
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### **i** Note

*These Control and Shut-off Butterfly valves are not subject to ATEX 2014/34/EU.*

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## Principle of operation



**Fig. 3:** Design of BR 14t Triple eccentric Butterfly valve

## Type Standard

The floating seat ring ( 4 ) adjusts its circular shape into an elliptical form in the closed position, adapting to the offset cone seat geometry.

The seat is integrated into the body ( 1 ).

The butterfly disc ( 3 ) functions as the support for the seat ring.

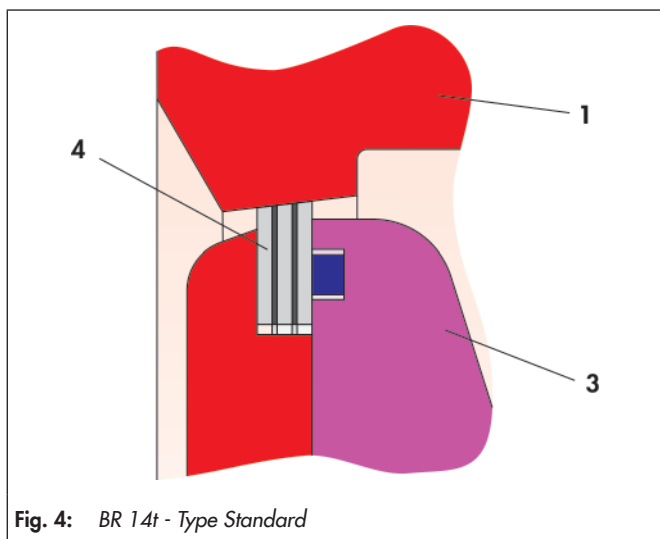


Fig. 4: BR 14t - Type Standard

## Type Double Seat

The floating seat ring ( 4 ) adjusts its circular shape into an elliptical form in the closed position, adapting to the offset cone seat geometry.

The seat ( 1a ) is replaceable and retained in the body ( 1 ) by screws.

The butterfly disc ( 3 ) functions as the support for the seat ring.

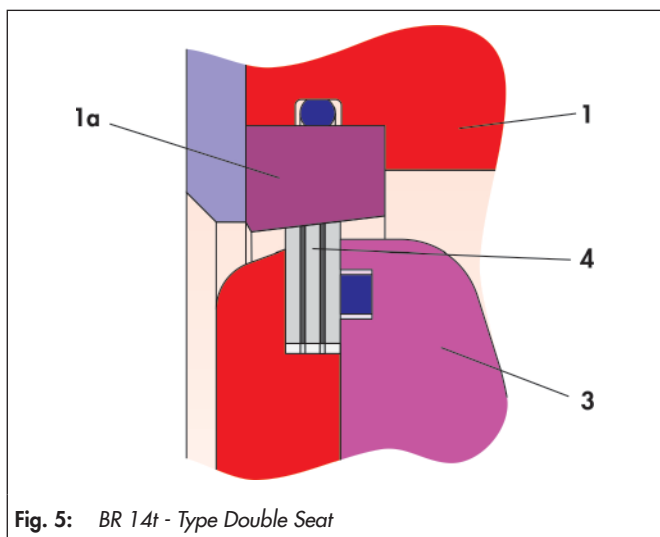


Fig. 5: BR 14t - Type Double Seat

## Type Single Seat

The floating seat ring ( 4 ) adjusts its circular shape into an elliptical form in the closed position, adapting to the offset cone seat geometry.

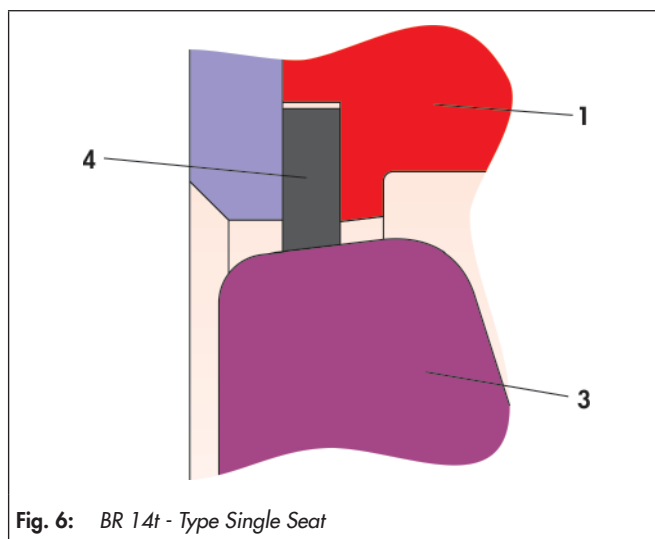


Fig. 6: BR 14t - Type Single Seat

## Fail-safe position

Depending on the mounting position of the actuator, there are two fail-safe positions, which become effective when the air pressure in the actuator is relieved or when the supply air fails:

- **Butterfly valve with actuator "fail-close"**  
On failure of air supply the butterfly valve closes.  
The valve opens when the air supply increases, overcoming the force of the springs.
- **Butterfly valve with actuator "fail-open"**  
On failure of air supply, the butterfly valve opens.  
The valve closes when the air supply increases, overcoming the force of the springs.

## Characteristic

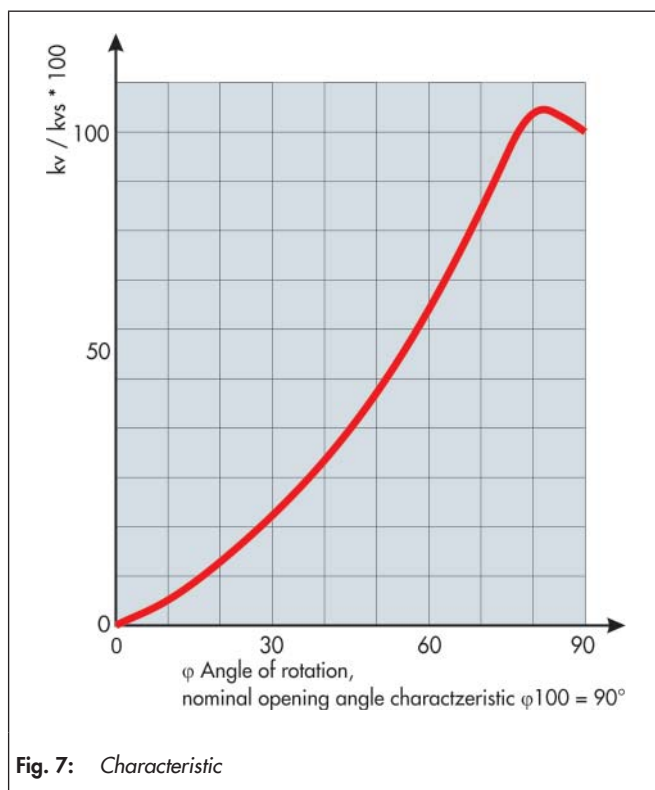


Fig. 7: Characteristic

**Table 2: General technical data**

Nominal size	DN 80 to DN 400 and NPS3 to NPS16	
Nominal pressure	PN 10 to 40 as well as cl150 and cl300	
Body style	Lug-Type and Wafer-Type	
Seat ring	Graphite and metal laminated seals	
Temperature range	See pressure-temperature diagram	
Leakage rate	Direction of flow A	Leakage rate A acc. to DIN EN 12266-1, P12 (Class VI acc. to ANSI/FCI 70-2-1991)
	Direction of flow B	
Rangeability	50:1	
Face to face	DIN	DIN EN 558, Series 16
	ANSI	API 609 cl150 or cl300
Perm. operating pressure	See pressure-temperature diagram	

**Table 3: Material**

	Steel	Stainless steel
Valve body	1.0619 / A216 WCB	1.4408 / A351 CF8M
Body seat	Stelloy / Stellite welding	
Seat ring	Laminated seals of 1.4462 and Carbon-Graphite	
Valve disc	1.0619 / A216 WCB	1.4408 / A351 CF8M
Valve shaft	1.4542 / AISI 630	
Packing	Carbon-Graphite	

**Table 4: Noise calculation data**

z values for sound pressure level calculation according to VDMA 24422.

φ	10°	20°	30°	40°	50°	60°	70°	80°	90°
Z	0.35	0.30	0.25	0.20	0.17	0.14	0.12	0.11	0.10

**Valve-specific correction terms**

- For liquids  $\Delta LF = 0$ ,
- For gases and vapors  $\Delta LG = 0$

**Table 5: Valve sizing terms**

For flow rate calculation acc. to DIN EN 60534.

Nominal pressure PN	φ	10°	20°	30°	40°	50°	60°	70°	80°	90°
PN 10 / 16 ANSI cl150	FL	0.83	0.81	0.80	0.79	0.74	0.69	0.61	0.56	0.53
	XT	0.51	0.50	0.49	0.47	0.42	0.36	0.31	0.26	0.25
PN 25 / 40 ANSI cl300	FL	0.82	0.80	0.80	0.78	0.74	0.65	0.54	0.49	0.45
	XT	0.51	0.50	0.49	0.46	0.39	0.31	0.25	0.22	0.20

**Table 6: kvs-Werte und Cv-Werte sowie die zugehörigen Öffnungswinkel**

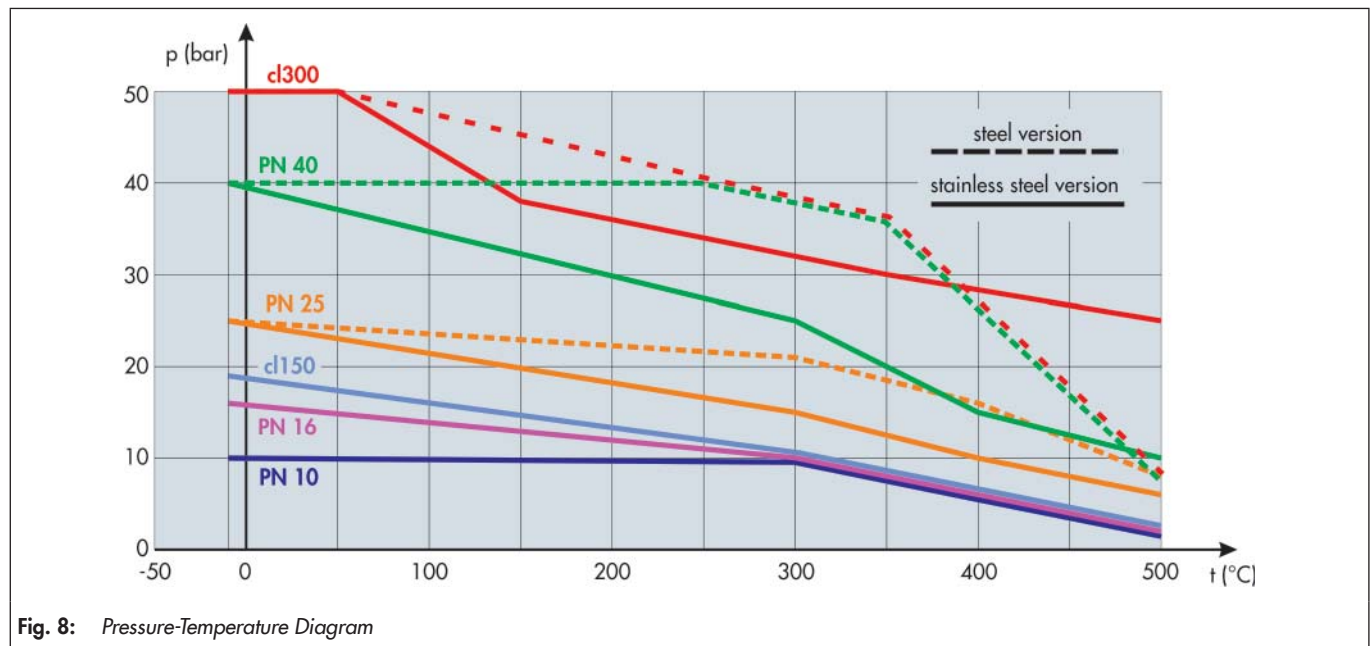
Nominal pressure PN	DN mm	NPS inch	Opening angle φ																	
			10°		20°		30°		40°		50°		60°		70°		80°		90°	
			kv	Cv	kv	Cv	kv	Cv	kv	Cv	kv	Cv	kv	Cv	kv	Cv	kv	Cv	kv	Cv
PN 10 - 40 cl150 - cl300	80	3	5	6	9	11	16	19	27	32	45	53	68	79	98	114	126	147	143	167
	100	4	9	11	17	20	31	36	54	63	89	104	136	159	191	223	248	289	282	329
	150	6	23	27	47	55	86	100	149	174	246	287	371	433	526	614	679	792	772	901
	200	8	48	56	96	112	176	205	307	358	506	591	766	894	1084	1265	1404	1638	1596	1863
	250	10	78	91	155	181	285	333	500	584	824	962	1244	1452	1760	2054	2279	2660	2589	3021
	300	12	122	142	244	285	446	520	783	914	1290	1505	1947	2272	2760	3221	3570	4166	4056	4733
	350	14	161	188	323	377	592	691	1038	1211	1711	1997	2584	3016	3660	4271	4737	5528	5383	6282
	400	16	213	249	426	497	781	911	1372	1601	2261	2639	3413	3983	4835	5642	6256	7300	7111	8298

**Table 7:** Closing torques

Nominal size		5 bar	10 bar	16 bar	25 bar	40 bar
DN 80	NPS3	53 Nm	61 Nm	72 Nm	73 Nm	100 Nm
DN 100	NPS4	88 Nm	95 Nm	105 Nm	123 Nm	170 Nm
DN 150	NPS6	195 Nm	220 Nm	250 Nm	317 Nm	440 Nm
DN 200	NPS8	360 Nm	419 Nm	490 Nm	597 Nm	810 Nm
DN 250	NPS10	590 Nm	708 Nm	850 Nm	1087 Nm	1550 Nm
DN 300	NPS12	880 Nm	1094 Nm	1350 Nm	1697 Nm	2450 Nm
DN 350	NPS14	1070 Nm	1279 Nm	1530 Nm	2150 Nm	3200 Nm
DN 400	NPS16	1490 Nm	1813 Nm	2200 Nm	3167 Nm	4867 Nm

The specified closing torques apply to metal-seated valves with shut-off class VI according to ANSI/FCI 70-2-1991

## Pressure-Temperature Diagram



The operating range is determined by the values specified in the pressure-temperature diagram. Process data and the medium may influence the values in the diagram.

## Dimensions

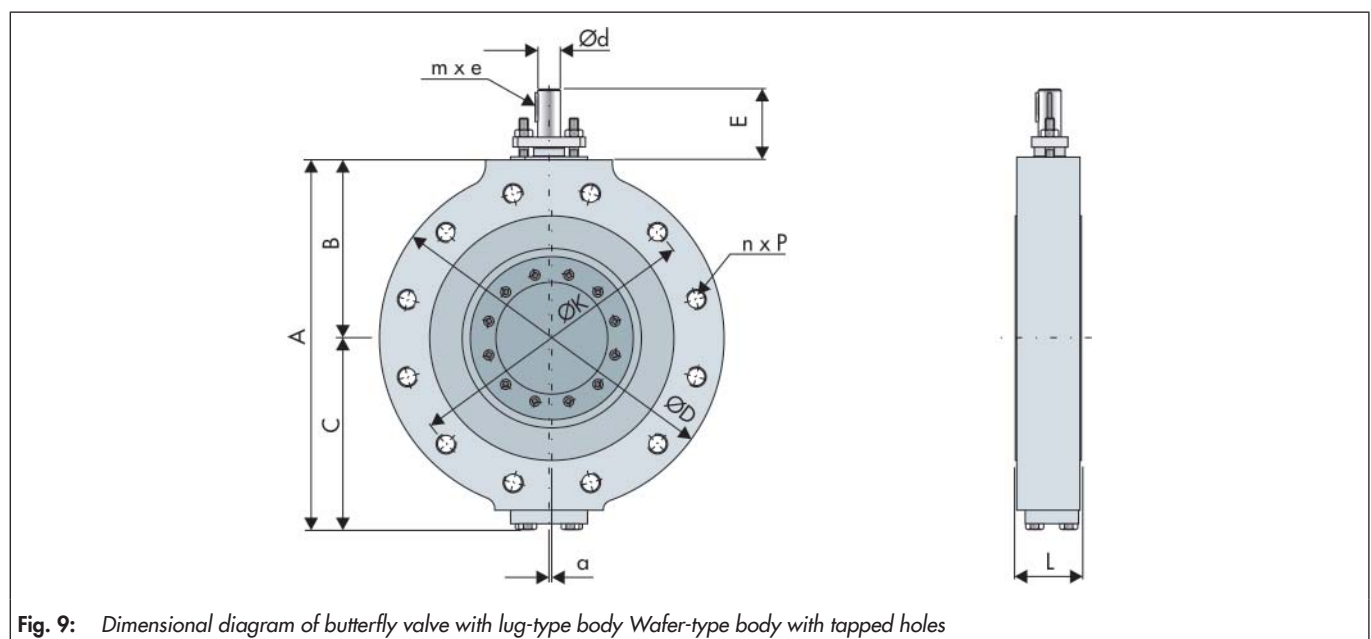


Table 8: Maße

DN	80	100	150	200	250	300	350	400	
NPS	3	4	6	8	10	12	14	16	
L	PN 10 to 40	64	64	76	89	114	114	127	140
	cl150	48	54	57	64	71	81	92	102
	cl300	48	54	59	73	83	92	117	133
A	232	274.3	346.3	408.4	491	564.5	658	713.5	
B	112	132	167	197	237	271	326	351	
C	120	142.3	179.3	211.4	254	293.5	332	362.5	
a	1	1.5	2	3	4	5	6	6	
ØD Lug-Type	PN 10	200	235	300	340	405	460	520	580
	PN 16	200	235	300	340	405	460	520	580
	PN 25	200	235	300	375	425	515	580	660
	PN 40	200	235	300	375	450	515	580	660
	cl150	210	230	280	343	406	483	534	597
	cl300	210	254	318	381	445	521	584	648
ØD Wafer-Type	PN 10	200	235	300	340	405	460	520	580
	PN 16	200	235	300	340	405	460	520	580
	PN 25	200	235	300	375	425	515	580	660
	PN 40	200	235	300	375	450	515	580	660
	cl150	210	230	280	343	406	483	534	597
	cl300	210	254	318	381	445	521	584	648
ØK	PN 10	160	180	240	295	350	400	460	515
	PN 16	160	180	240	295	355	410	470	525
	PN 25	160	190	250	310	370	430	490	550
	PN 40	160	190	250	320	385	450	510	585
	cl150	152.4	190.5	241.3	298.5	362	431.8	476.3	539.8
	cl300	168.1	200.2	269.7	330.2	387.4	450.9	514.4	571.5
n x P Lug-Type	PN 10	8 x M16	8 x M16	8 x M20	8 x M20	12 x M20	12 x M20	16 x M20	16 x M24
	PN 16	8 x M16	8 x M16	8 x M20	12 x M20	12 x M24	12 x M24	16 x M24	16 x M27
	PN 25	8 x M16	8 x M20	8 x M24	12 x M24	12 x M27	16 x M27	16 x M30	16 x M33
	PN 40	8 x M16	8 x M20	8 x M24	12 x M27	12 x M30	16 x M30	16 x M33	16 x M36
	cl150	4 x 5/8"	8 x 5/8"	8 x 3/4"	8 x 3/4"	12 x 7/8"	12 x 7/8"	12 x 1"	16 x 1"
	cl300	4 x 5/8"	8 x 3/4"	12 x 3/4"	12 x 7/8"	16 x 1"	16 x 11/8"	20 x 11/8"	20 x 11/4"
n x ØP Wafer-Type	PN 10	8 x 18	8 x 18	8 x 22	8 x 22	12 x 22	12 x 22	16 x 22	16 x 26
	PN 16	8 x 18	8 x 18	8 x 22	12 x 22	12 x 26	12 x 26	16 x 26	16 x 30
	PN 25	8 x 18	8 x 22	8 x 26	12 x 26	12 x 30	16 x 30	16 x 33	16 x 36
	PN 40	8 x 18	8 x 22	8 x 26	12 x 30	12 x 33	16 x 33	16 x 36	16 x 39
	cl150	4 x 19.1	8 x 19.1	8 x 22.4	8 x 22.4	12 x 25.4	12 x 24.5	12 x 28.4	16 x 28.4
	cl300	8 x 22.4	8 x 22.4	12 x 22.4	12 x 25.4	16 x 28.4	16 x 31.8	20 x 31.8	20 x 35.1
E	57	57	76	78	98	98			
Ød	15	15	20	25	30	35	40	45	
m x e	1 x 5	1 x 5	2 x 6	2 x 8	2 x 8	2 x 10	2 x 12	1 x 14	

## Control valve selection and sizing

1. Calculate the appropriate KV coefficient
2. Select the valve size and KVS coefficient from Table 6
3. Check whether the valve is suitable for the operating conditions, taking into account the pressure-temperature diagram
4. Select an appropriate actuator

## Ordering text

Butterfly valve: BR 14t,  
Nominal size: DN . . . . . / NPS . . . . .  
Nominal pressure: PN . . . . . / cl . . . . .  
Optionally, special version: . . . . .  
Hand-operated actuator or actuator make: . . . . .  
Signal pressure: . . . . . bar  
Fail-safe action : . . . . .  
Limit switch (brand name): . . . . .  
Solenoid valve (brand name): . . . . .  
Positioner: . . . . .  
Other: . . . . .

## Associated data sheets

- for pneumatic Multi-turn actuator ▶ TB 30a
- for pneumatic Quarter-turn actuator ▶ TB 31a

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### 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*

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