

BR 14b / BR 14c · High-Performance Butterfly Valve

DIN and ANSI-Version

**Application**

Tight-closing, double-eccentric butterfly control valve especially for the chemical industry where aggressive media's are used, for example in steam pipelines:

- **Nominal size NPS2 to NPS32 and DN 50 to 800**
- **Nominal pressure cl150 and cl300 as well as PN 10 to 40**
- **Temperatures -76 to 662°F (-60 to 350°C)**

Our newly developed high performance shut-off and control butterfly valve, which has its own patent and has the following special features:

- **Valve body made of**
 - Steel or
 - Stainless steel
- **Body style**
 - Wafer-Type or
 - Lug-Type
- **Sealing**
 - Type **WTD**, soft sealing with PTFE V-ring packing, pre-loaded with belleville washers
 - Type **MTD**, metallic sealing with PTFE V-ring packing, pre-loaded with belleville washers
- **Further features**
 - Low breakaway torque and low amount of wear due to the double eccentric bearing design of the shaft
 - „Long neck“ versions which allows an easier installation in pipelines with insulation
 - TA-Luft (German clean air act) packing
 - A continuous raised face is assured through our patent protected screw less fastening ring
 - Anti blow out valve shaft
 - Soft seat rings can be replaced with metal seat rings on site
 - Face-to face acc. to API 609 Class 150
 - Face-to face acc. to DIN EN 558, series 20, 25, 16
 - Face-to-face dimensions can be changed by using different fastening rings
 - Attachment options acc. to DIN ISO 5211

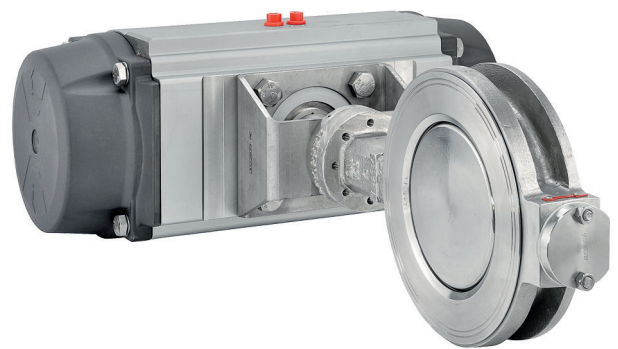


Fig. 1: BR 14b Butterfly valve with BR 31a Quarter-turn actuator



Fig. 2: BR 14b Butterfly valve with Manual gear actuator

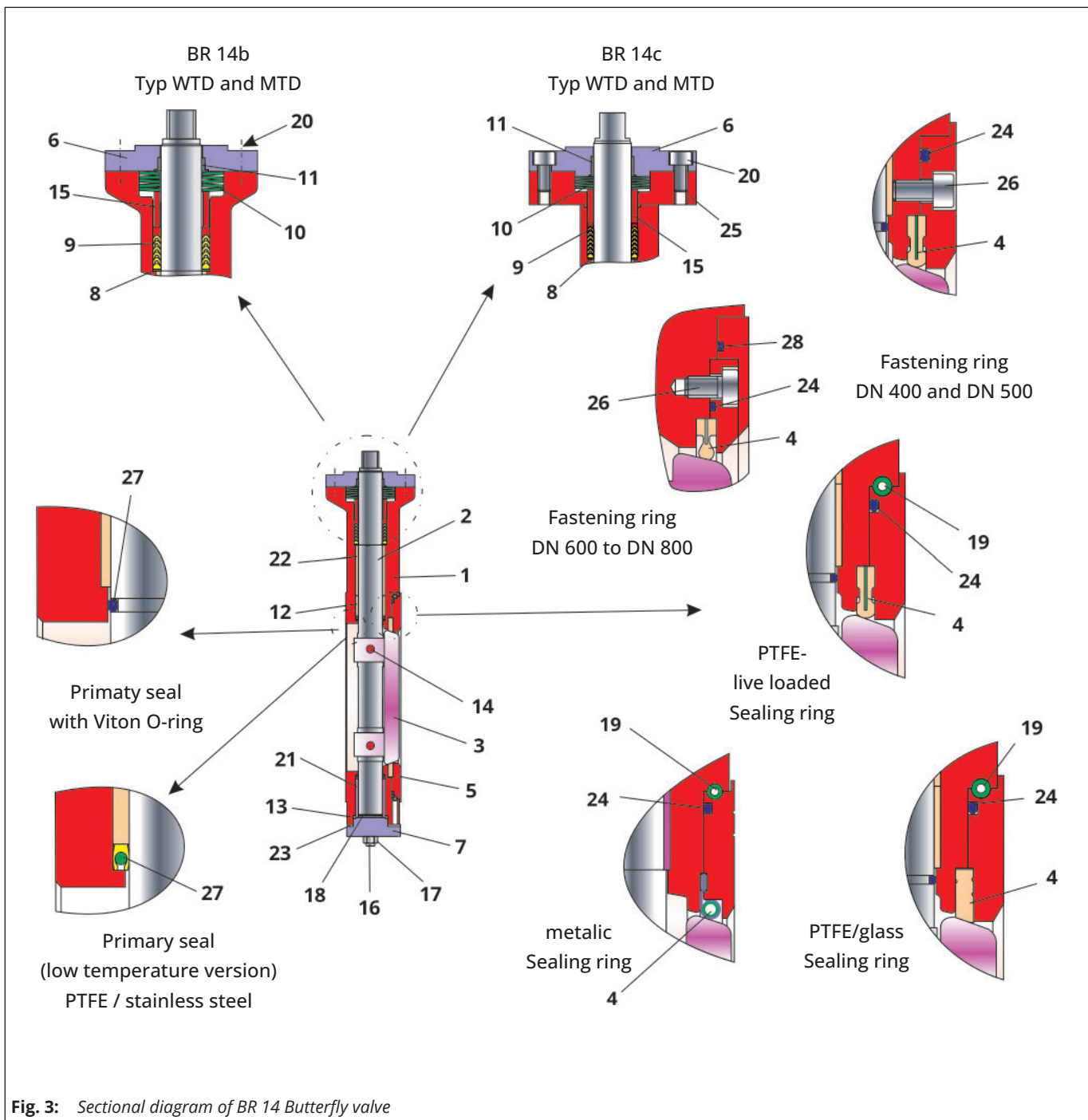


Fig. 3: Sectional diagram of BR 14 Butterfly valve

Table 1: Parts list

Item	Description
1	Valve body
2	Valve shaft
3	Valve disc
4	Sealing ring
5	Fastening ring
6	Packing box flange
7	Bonnet
8	Washer
9	Packing
10	Belleville spring washer

Item	Description
11	Bushing
12	Bushing
13	Body seal
14	Grooved pin
15	Spacer bushing
16	Stud bolt
17	Nut
18	Lower disc
19	Tension spring
20	Screw

Item	Description
21	Spacer bushing
22	Spacer bushing
23	Bonnet seal
24	O-ring
25	Intermediate flange
26	Screw
27	Primary seal
28	O-Ring

Versions

Control valve BR 14b: Cast iron design

Control valve BR 14c: Solid material design

Optionally available in the following versions:

- Butterfly valve with Hand lever / grid plate.
- Butterfly valve with Manual gear actuator.
- Butterfly valve with pneumatic rotary actuator.

Special versions

- Double stuffing box
- Primary seal with O-ring
- Facing with groove, only series 16 and 25 of DIN EN 1092
- Special materials
- Low temperature version (-196 °C)
- High temperature version (> 350 °C)

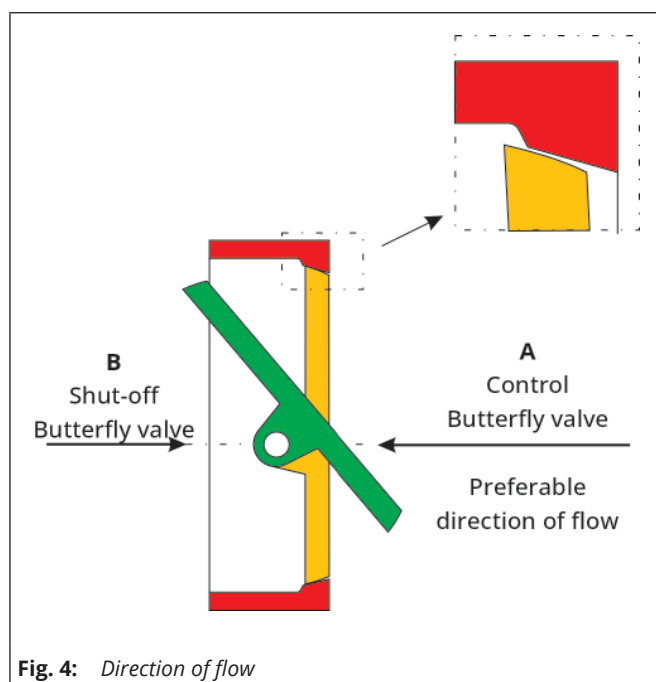
Additional accessories

The control valves are also available without accessories or in combination with the following parts:

- Positioner
- Limit switch
- Solenoid valve
- Air sets
- Gauge block

Other special accessories are available on request.

Direction of flow



Principle of operation

The process medium can flow through the valve in both directions.

The disc (3) determines the flow through the free area between disc and seat (4).

Butterfly valves are sealed between the disc (3) and the seat (4).

The shaft (2) is sealed by a packing (9).

This is a PTFE-V-ring packing, which by means of the mounted spring washers (10) located in the top part of the packing chamber, are maintenance free and under tension.

Optionally, the packing can also consist of a PTFE-mesh-work packing, which is pre-loaded over an adjustable stuffing box.

The direction of flow and the pressure difference determine the breakaway torque to open the butterfly valve.

The double eccentric bearing design of the shaft causes the disc on opening and closing to remain in contact with the seat only over a very small angle of rotation (Fig. 4).

This reduces wear and increases the service life of the valve.

In addition, it reduces the breakaway torque.

When the process medium flows through the valve in direction A (Fig. 4), the butterfly disc is slightly pressed out of the seat. This reduces the pre-loaded pressure and the breakaway torque.

When the process medium flows through the valve in direction B, the pre-loaded pressure increases, with a rise in the breakaway torque.

This results in a better tightness being achieved.

Failure position

Depending on the mounting position of the actuator, there are two failure positions, which become active, either by pressure relieving or, failure of air supply:

- **Butterfly valve with actuator "on failure closing"**
on failure of air supply the butterfly valve closes. The opening of the valve accrues by increasing air supply against the force of the springs.
- **Butterfly valve with actuator "on failure opening"**
on failure of air supply, the butterfly valve opens. The closing of the valve accrues by increasing air supply against the force of the springs.

i Info

These valves are not subject to ATEX 2014/34/EU.

Dimensions and weights

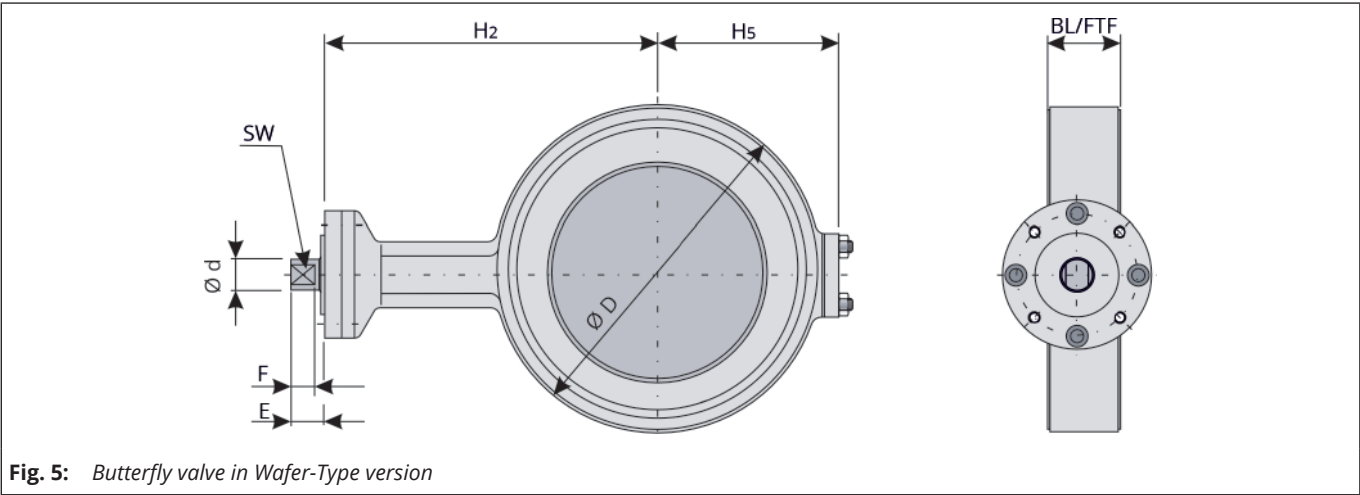


Fig. 5: Butterfly valve in Wafer-Type version

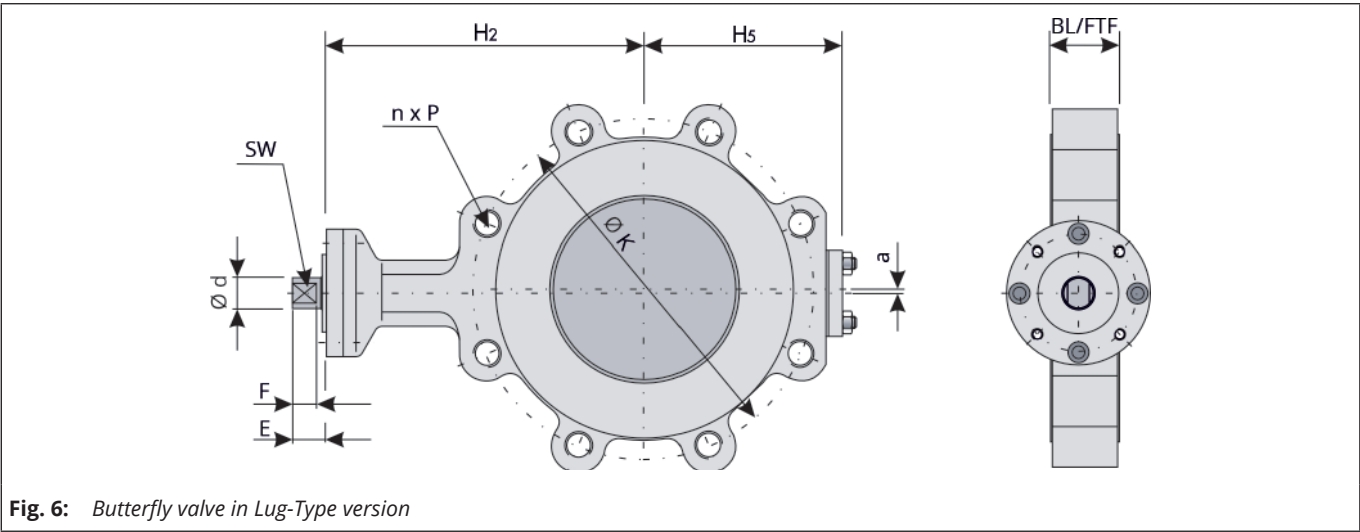


Fig. 6: Butterfly valve in Lug-Type version

Table 2: Dimensions in mm

DN		50	80	100	150	200	250	300	350	400	500	600	700	800
NPS		2	3	4	6	8	10	12	14	16	20	24	28	32
L	EN 558, Series 20, PN 10 / 40 API 609, cl150	43	46	52	56	60	68	78	78	102	127	154	165	190
	EN 558, Series 25, PN 10 / 40 + (cl150)	-	49	56	70	71	76	83	92	102	127	154	-	-
	EN 558, Series 16, PN 10 / 40 + cl150/300	43	64	64	76	89	114	114	127	140	152	178	229	241
A		190.5	255	278	366	469	496	544	645	676	825.5	1057	1177	1340
B		123	160	170	225	277	262	300	360	377	445	597	652	740
C		67.5	95	108	141	192	234	244	285	299	380.5	460	525	600
a		1	1.6	2	3	4	5	6	7	8	10	12	14	16
E		14	20	19	22	25	25	31	31	37	43	180	180	180
F		9	14	14	17	19	19	24	24	30	34	60	60	60
Ø d		13	18	18	22	26	26	33	39	42	54	70	70	80
SW		9	14	14	17	19	19	24	24	30	34	55	55	65
DIN ISO Connection		F04	F05	F05	F07	F10	F10	F12	F12	F14	F16	depending on the actuator		

Table 3: Dimensions in mm and wights in kg of the Wafer-Type Butterfly valve

DN	50	80	100	150	200	250	300	350	400	500	600	700	800
NPS	2	3	4	6	8	10	12	14	16	20	24	28	32
n x Ø P	4x18	8x18	8x18	8x22	8x22	12x22	12x22	16x22	16x26	20x26	20x30	24x30	24x33
Ø K	125	160	180	240	295	350	400	460	515	620	725	840	950
Ø D	104	140	162	218	272	326	372	438	490	594	695	806	930
n x Ø P	4x18	8x18	8x18	8x22	12x22	12x26	12x26	16x26	16x30	20x33	4xM33 + 16x36	4xM33 + 20x36	4xM36 + 20x39
Ø K	125	160	180	240	295	355	410	470	525	650	770	840	950
Ø D	104	140	162	218	272	326	382	438	490	615	725	806	906
n x Ø P	4x18	8x18	8x22	8x26	12x26	12x30	16x30	16x33	16x36	20x36	4xM36 + 16x39	4xM39 + 20x42	4xM45 + 20x48
Ø K	125	160	190	250	295	370	430	490	550	660	770	875	990
Ø D	104	140	162	218	285	326	382	438	490	615	725	800	930
n x Ø P	4x18	8x18	8x22	8x26	12x30	12x33	16x33	16x36	16x39	20x42	4xM45 + 16x48	4xM45 + 20x48	4xM57 + 20x56
Ø K	125	160	190	250	295	385	450	510	585	670	795	900	1030
Ø D	104	140	162	218	285	326	382	438	490	615	735	845	960
n x Ø P	4x19.1	4x19.1	8x19.1	8x22.4	8x22.4	12x25.4	12x25.4	12x28.4	16x28.4	20x1½"	4x1¼" + 16x35.1	*)	*)
Ø K	120.7	152.4	190.5	241.3	298.5	362	431.8	476.3	539.8	635	749.3	*)	*)
Ø D	104	134	162	217	272	326	382	438	490	594	695	*)	*)
n x Ø P	-	-	-	-	-	-	-	-	-	-	-	4x1¼" + 24x35.1	4x1½" + 24x42
Ø K	-	-	-	-	-	-	-	-	-	-	-	863.6	977.9
Ø D	-	-	-	-	-	-	-	-	-	-	-	806	930
n x Ø P	-	-	-	-	-	-	-	-	-	-	-	8x¾" + 32x22.4	8x¾" + 40x22.4
Ø K	-	-	-	-	-	-	-	-	-	-	-	795.3	900.2
Ø D	-	-	-	-	-	-	-	-	-	-	-	765	863.6
n x Ø P	-	8x22.3	8x22.3	12x22.3	12x25.4	16x28.4	16x31.7	20x31.7	16x35	24x35	4x1½" + 32x22.4	*)	*)
Ø K	-	168.3	200.2	269.7	330.2	387.4	450.9	514.4	571.5	685.8	812.8	*)	*)
Ø D	-	140	162	217	272	326	382	438	490	594	735	*)	*)
Weight (Series 20)	3.5 kg	4.8 kg	6.5 kg	12 kg	19 kg	41 kg	40 kg	*)	90 kg	146.5 kg	*)	*)	*)

*) on request

Table 4: Dimensions in mm and wights in kg of the Wafer-Type Butterfly valve

DN	50	80	100	150	200	250	300	350	400	500	600	700	800
NPS	2	3	4	6	8	10	12	14	16	20	24	28	32
n x Ø P	4xM16	8xM16	8xM16	8xM20	8xM20	12xM20	12xM20	16xM20	16xM24	20xM24	20xM27	24xM27	24xM30
Ø K	125	160	180	240	295	350	400	460	515	620	725	840	950
n x Ø P	4xM16	8xM16	8xM16	8xM20	12xM20	12xM24	12xM24	16xM24	16xM27	20xM30	20xM33	24xM33	24xM36
Ø K	125	160	180	240	295	355	410	470	525	650	770	840	950
n x Ø P	4xM16	8xM16	8xM20	8xM24	12xM24	12xM27	16xM27	16xM30	16xM33	20xM33	20xM36	24xM39	24xM45
Ø K	125	160	190	250	310	370	430	490	550	660	770	875	990
n x Ø P	4xM16	8xM16	8xM20	8xM24	12xM27	12xM27	16xM30	16xM33	16xM36	20xM39	20xM45	24xM45	24xM52
Ø K	125	160	190	250	320	385	450	510	585	670	795	900	1030
n x Ø P	4x¾"	4x¾"	8x¾"	8x¾"	8x¾"	12x¾"	12x¾"	12x1"	16x1"	20x1½"	20x1¼"	*)	*)
Ø K	120.7	152.4	190.5	241.3	298.5	362	431.8	476.3	539.8	635	749.3	*)	*)
n x Ø P	-	-	-	-	-	-	-	-	-	-	-	28x1¼"	28x1½"
Ø K	-	-	-	-	-	-	-	-	-	-	-	863.6	977.9
n x Ø P	-	-	-	-	-	-	-	-	-	-	-	40x¾"	40x¾"
Ø K	-	-	-	-	-	-	-	-	-	-	-	795.3	900.2
n x Ø P	-	8x¾"	8x¾"	12x¾"	12x¾"	16x1"	16x1½"	20x1½"	20x1¼"	24x1¼"	24x1½"	*)	*)
Ø K	-	168.1	200.2	269.7	330.2	387.4	450.9	514.4	571.5	685.8	812.8	*)	*)
Weight (Series 20)	6 kg	7 kg	10 kg	18 kg	28 kg	42 kg	66 kg	*)	122 kg	220 kg	566 kg	*)	*)

*) on request

Table 5: Technical data

Nominal size		NPS2 ... 32 as well as DN 50 ... 800	
Nominal pressure		cl150 and cl300 as well as PN 10 ... 40	
Body style		Lug-Type or Wafer-Type	
Seat ring		Soft sealing PTFE - live loaded	Metal sealing
Temperature range		-76 °F ... 410 °F (-60 °C ... +210 °C)	-76 °F ... +662 °F (-60 °C ... +350 °C)
Leakage for	direction of flow A	Leakage rate A acc. to DIN EN 12266-1, P12	Leakage rate VI acc. to DIN EN 1349
	direction of flow B	On request as it depends on pressure and temperature	
Rangeability		50 : 1	
Face to face	ANSI	Class 150: acc. to API 609 (DIN EN 558, Series 20), Class 300: acc. to EN 558, Series 16	
	DIN	acc. to DIN EN 558, Series 20, Special Version: acc. to DIN EN 558, Series 25, 16	
Perm. operating pressures		See pressure-temperature diagram	

Table 6: Materials

		DIN	ANSI
Valve body	Casted version	1.4408/ 1.0619	A351 CF8M / A216 WCB
	Platt/forged version	1.4571/ 1.0570 etc.	A240 Gr. 316L / A516 Gr.70 etc.
Butterfly disc		1.4408	A351 CF8M
Butterfly shaft		1.4462 / 1.4542 / H1150	A182 F51 / AISI 630 / H1150D
Fastening ring		1.4571	A479 F316Ti
Stuffing box flange		1.4571	A479 F316Ti
Sealing ring	soft	PTFE-live loaded / R-PTFE	
	metal	Nickel	
Packing		PTFE - V-ring-packing with cup springs of 1.8159, Delta Tone coated	

Table 7: Body version, materials and associated temperature ranges (HT - High-temperature version)

Butterfly valve version and body material		Shaft material and seat sealing AISI 630 / H1150D	
		PTFE - soft sealing live loaded	HT-metal sealing
Series 14b Casted version	A 351 CF8M	-76 °F ... +410 °F (-60 °C ... +210 °C)	-76 °F ... +572 °F (-60 °C ... +300 °C)
	A 216 WCB / WCC	14 °F / -21 °F ... +410 °F (-10 / -29 °C ... +210 °C)	14 / -21 °F ... +572 °F (-10 / -29 °C ... +300 °C)
	1.4408	-76 °F ... +410 °F (-60 °C ... +210 °C)	-76 °F ... +572 °F (-60 °C ... +300 °C)
	1.0619	14 °F ... +410 °F (-10 °C ... +210 °C)	14 °F ... +662 °F (-10 °C ... +350 °C)
Series 14c Platt / forged version	A 240 Gr.316L	-76 °F ... +410 °F (-60 °C ... +210 °C)	-76 °F ... +662 °F (-60 °C ... +350 °C)
	A 516 Gr.70	14 °F ... +410 °F (-10 °C ... +210 °C)	14 °F ... +662 °F (-10 °C ... +350 °C)
	S355J2G3	14 °F ... +410 °F (-10 °C ... +210 °C)	14 °F ... +662 °F (-10 °C ... +350 °C)
	1.4571	-76 °F ... +410 °F (-60 °C ... +210 °C)	-76 °F ... +662 °F (-60 °C ... +350 °C)

Functional diagram with opening angles

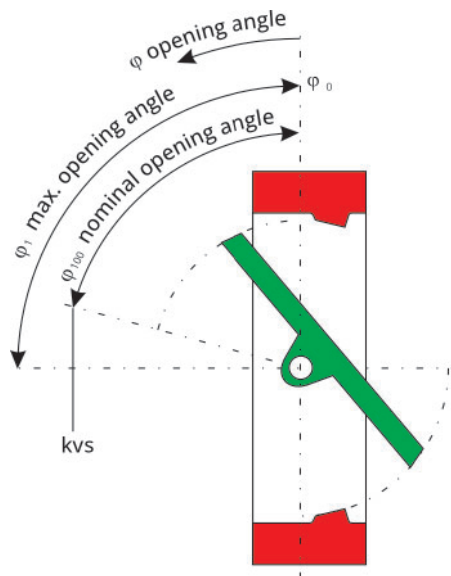


Fig. 7: Functional diagram with opening angles

Characteristic curve

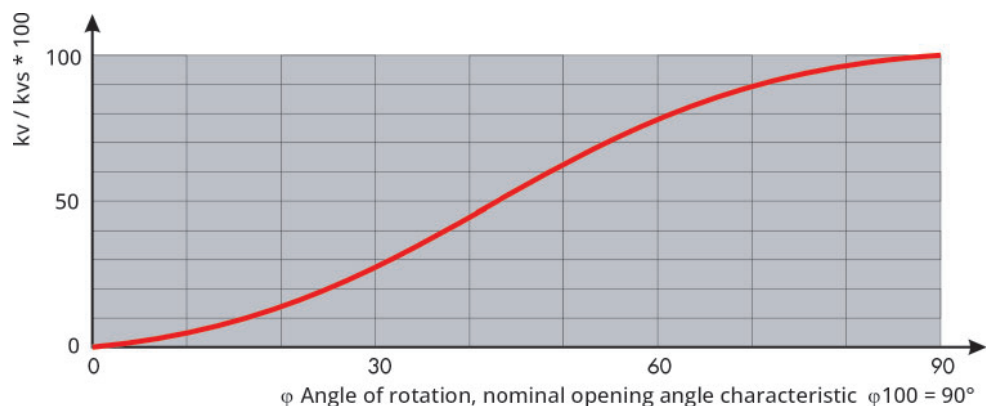


Fig. 8: Characteristic curve

Table 8: Terms for noise level calculation

z-values for noise level calculation acc. to VDMA 24422 and Terms for control valve sizing acc. to DIN EN 60534.

φ	10°	20°	30°	40°	50°	60°	70°	80°	90°
FL	0.95	0.95	0.92	0.82	0.74	0.67	0.61	0.57	0.54
xT	0.75	0.75	0.73	0.57	0.47	0.38	0.31	0.28	0.25
z	0.35	0.30	0.25	0.20	0.17	0.14	0.12	0.11	0.10

Correction terms

With gases and vapors $\Delta LG = 0$,

With liquids $\Delta LF = 0$

Table 9: *kv values ¹⁾ and related opening angles*

Nominal size		φ Opening angle								
DN	NPS	10°	20°	30°	40°	50°	60°	70°	80°	90°
50	2	0.9	2.7	9	18	27	39	54	86	89
80	3	4.5	23	45	68	93	118	133	147	150
100	4	7	36	72	108	149	190	214	235	240
150	6	21	105	210	315	434	553	623	686	700
200	8	42	208	417	625	862	1098	1237	1362	1390
250	10	68	341	681	1022	1407	1793	2020	2224	2270
300	12	100	501	1002	1503	2071	2639	2973	3273	3340
400	16	183	915	1830	2745	3782	4819	5429	5978	6100
500	20	289	1443	2886	4329	5964	7600	8562	9427	9620
600	24	423	2113	4227	6340	8735	11132	12542	13810	14093
700	28	576	2878	5756	8635	11897	15161	17080	18806	19191
800	32	754	3767	7533	11300	15568	19839	22350	24608	25112

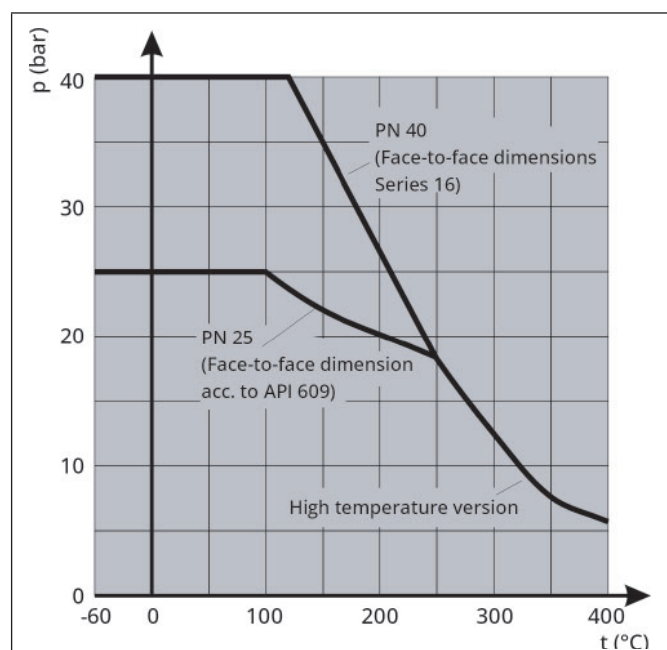
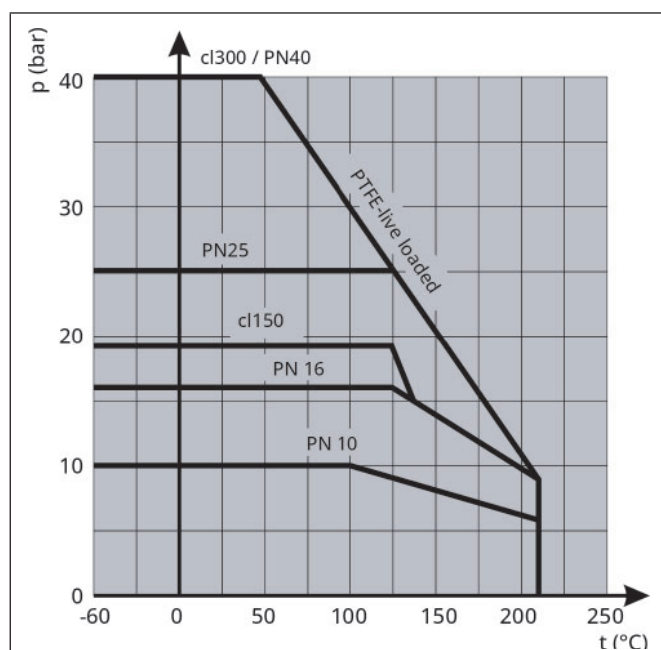
¹⁾ The kv value [m³/h] indicates the water flow at a temperature of 5 °C to 30 °C and a Δp of 1 bar.

Table 10: *Cv values and related opening angles*

Nominal size		φ Opening angle								
DN	NPS	10°	20°	30°	40°	50°	60°	70°	80°	90°
50	2	1.1	3.2	11	21	32	46	63	101	104
80	3	5.3	27	53	80	109	138	156	172	176
100	4	8	42	84	126	174	222	250	275	281
150	6	25	123	246	369	508	647	729	803	819
200	8	49	243	488	731	1009	1285	1447	1594	1626
250	10	80	399	797	1196	1646	2098	2363	2602	2656
300	12	117	586	1172	1759	2423	3088	3478	3829	3908
400	16	214	1071	2141	3212	4425	5638	6352	6994	7137
500	20	338	1688	3377	5065	6978	8892	10018	11030	11255
600	24	495	2472	4946	7418	10220	13024	14674	16157	16489
700	28	674	3367	6734	10103	13918	17738	19983	22003	22453
800	32	882	4407	8813	13221	18214	23211	26150	28791	29381

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.



Torque and breakaway torques

Table 11: Max. permissible torque and breakaway torque for *soft sealed Butterfly valves*

Nominal size		Perm. torques M _{dmax} . in Nm with shaft in			Breakaway torque M _{dl} in Nm with differential pressure Δp in bar (direction of flow B)							
DN	NPS	1.4542 / H1150	1.4542	1.4462	0	5	10	16	20	25	30	40
50	2	224	311	197	22	29	36	41	45	50	55	65
80	3	679	943	424	43	44	45	51	55	60	65	75
100	4	679	943	424	49	54	59	67	73	81	89	105
150	6	1231	1710	770	72	83	94	102	108	116	124	140
200	8	1911	2654	1194	117	153	189	241	276	320	364	452
250	10	1911	2654	1194	177	230	283	329	360	-		
300	12	3886	5398	2429	354	466	578	654	705			
400	16	7848	10900	4905	525	746	967	1111	1207			
500	20	14325	19895	8953	641	953	1265	1491	1642			
600	24	18591	-		1399	1910	3819	6110	7640			
700	28	18591			2226	3085	6170	9872	12340			
800	32	18591			3336	4662	9324	14918	18648			

Table 12: Max. permissible torque and breakaway torque for *metal sealed Butterfly valves*

Nominal size		Perm. torques M _{dmax} . in Nm with shaft in			Breakaway torque M _{dl} in Nm with differential pressure Δp in bar (direction of flow A)							
DN	NPS	1.4542 / H1150	1.4542	1.4462	0	5	10	16	20	25	30	40
50	2	224	311	197	23	29	36	41	52	56	73	89
80	3	679	943	424	32	38	46	58	73	79	103	125
100	4	679	943	424	43	51	73	92	116	126	164	199
150	6	1231	1710	770	60	127	183	230	290	316	410	500
200	8	1911	2654	1194	82	241	348	437	551	600	779	950
250	10	1911	2654	1194	189	473	683	892	1224	-		
300	12	3886	5398	2429	357	609	893	1383	1710			
400	16	7848	10900	4905	523	1024	1638	2386	2885			
500	20	14325	19895	8953	2616	3280	3700	4204	4540			

The breakaway torques specified in Table 11 and Table 12 are average values which were measured with air at 20°C with the corresponding pressure differences. Operating temperature, process medium and long operating times may affect the permissible torques and breakaway torques considerably.

The maximum permissible torques listed apply to the standard material listed in Table 4.

Selecting and sizing the butterfly valve

1. Calculate the appropriate kv value.
2. Select the nominal size and the kvs value from Table 5 resp. 6.
3. Comparing the operation conditions in acc. to the pressure-temperature diagram.
4. Select a suitable actuator.

Ordering text:

High-Performance butterfly valve BR 14b

Nominal size DN

Nominal pressure PN

Valve body material acc. to table 2

Seat seal Metal sealing or soft sealing

Direction of flow "A" standard direction of flow for
throttling service "B" reversed
direction of flow for shut off service

Manual gear or

Actuator brand name:

Fail-safe position Valve OPEN or valve CLOSED

Supply air bar

Operating range Number of springs

Operating pressure bar

Medium temperature °C or °F

Medium Dry or lubricating

Limit switch brand name:

Solenoid valve brand name:

Positioner brand name:

Others

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 confirm.

Associated Documents

- Mounting and operating instructions ► EB 14b
- Safety manual ► SH 14
- For Quarter-turn actuator ► TB 31a