

High - Performance Butterfly valve Series 14b / Series 14c

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 sizes 3" to 20" as well as DN 80 to DN 500.
- Nominal pressure ANSI 150 / 300 lbs and PN 10 to 40.
- Temperatures -76°F to 662°F (-60°C 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.
 - **Type WNS**, soft sealing with adjustable stuffing box flange
- **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 screwless 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 558-1, series 20, 25, 16.
 - Face-to face acc. to DIN EN 558-2, series 20 and 16.
 - Face-to-face dimensions can be changed by using different fastening rings.
 - Attachment options acc. to DIN ISO 5211

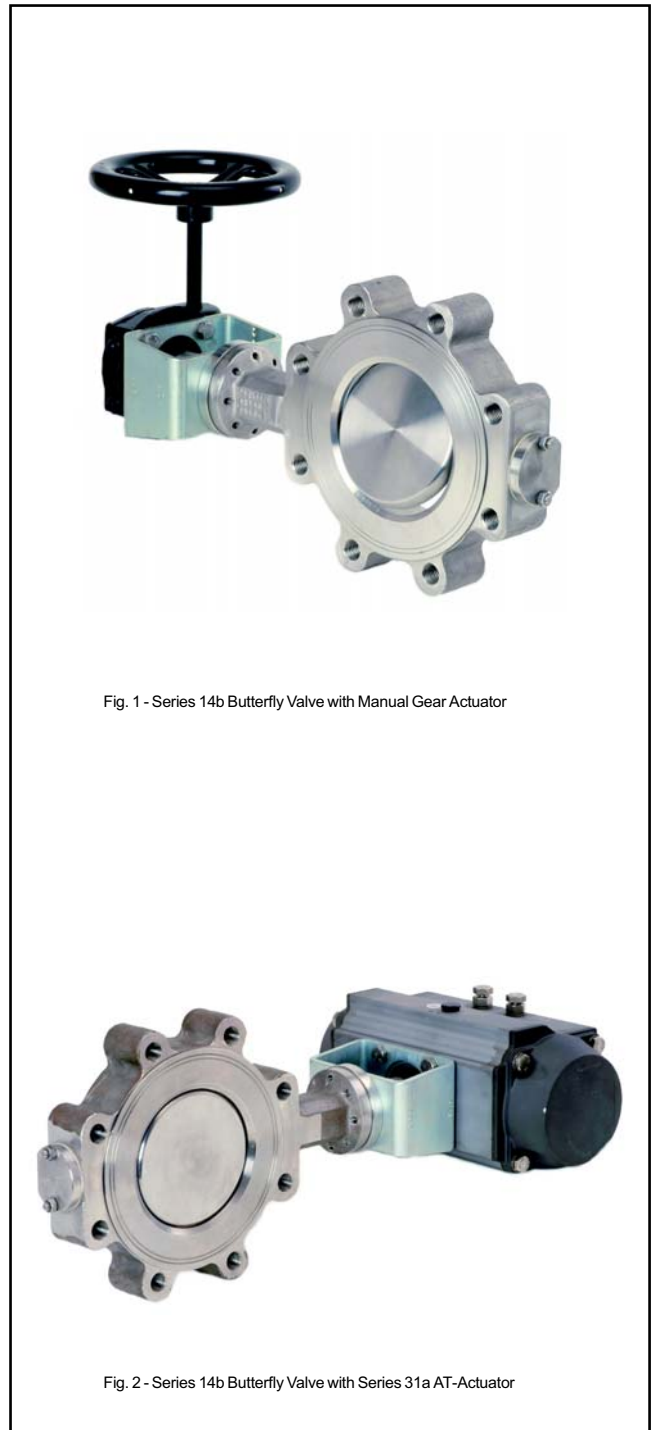


Fig. 1 - Series 14b Butterfly Valve with Manual Gear Actuator

Fig. 2 - Series 14b Butterfly Valve with Series 31a AT-Actuator

High Performance Butterfly Valve Series 14b / 14c

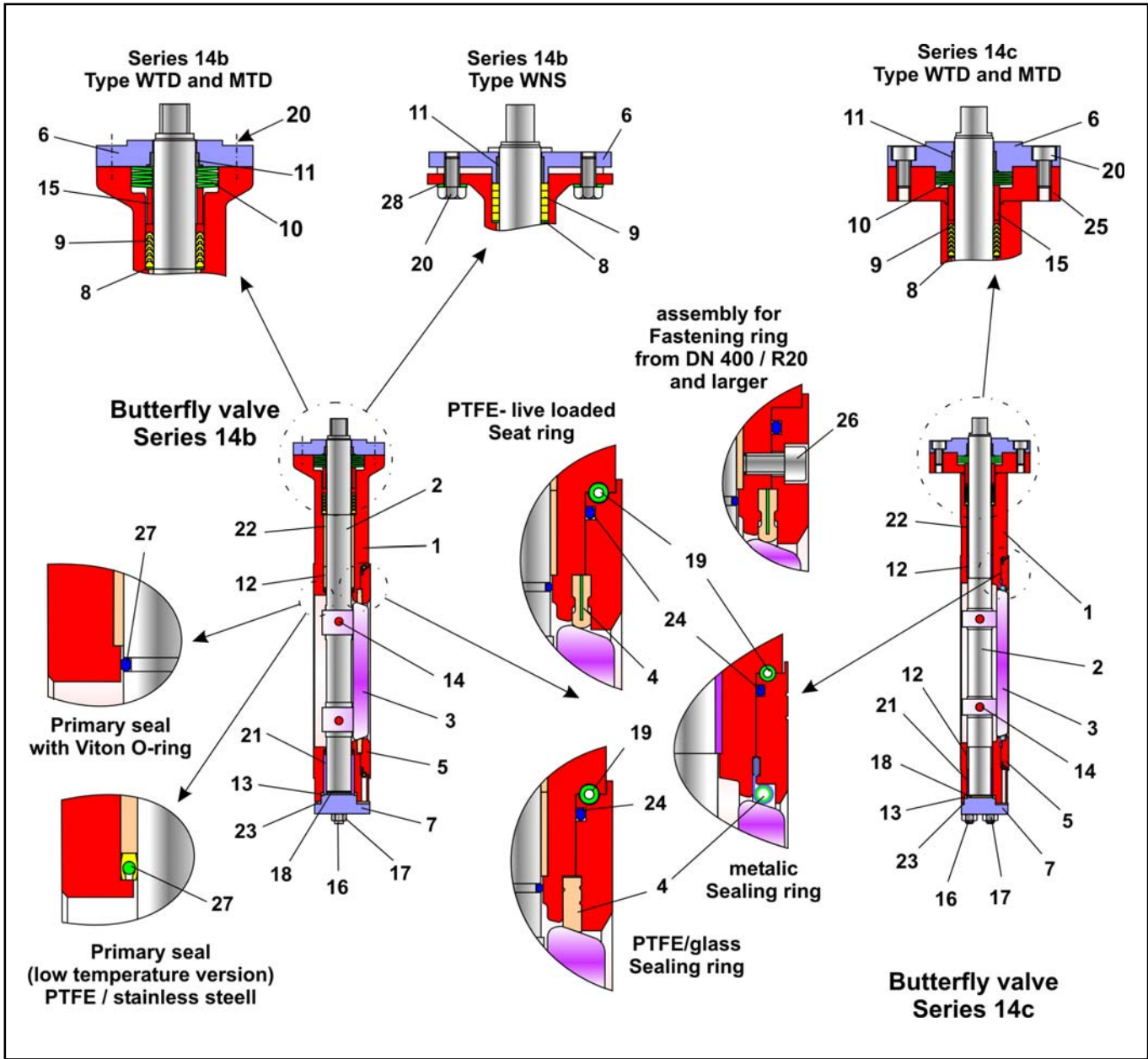


Fig. 3 - Sectional diagram of Series 14 Butterfly Valve

| Item | Description |
|------|--------------------------|
| 1 | Valve body |
| 2 | Valve shaft |
| 3 | Valve disc |
| 4 | Seat ring |
| 5 | Fastening ring |
| 6 | Packing box flange |
| 7 | Bonnet |
| 8 | Washer |
| 9 | V-ring 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 | Bushing |
| 22 | Spacer bushing |
| 23 | Bonnet seal |
| 24 | O-ring |
| 25 | Intermediate flange |
| 26 | Screw |
| 27 | Primary seal |
| 28 | Washer |

Table 1 - Parts list

High Performance Butterfly Valve Series 14b / 14c

Dimensions and weights:

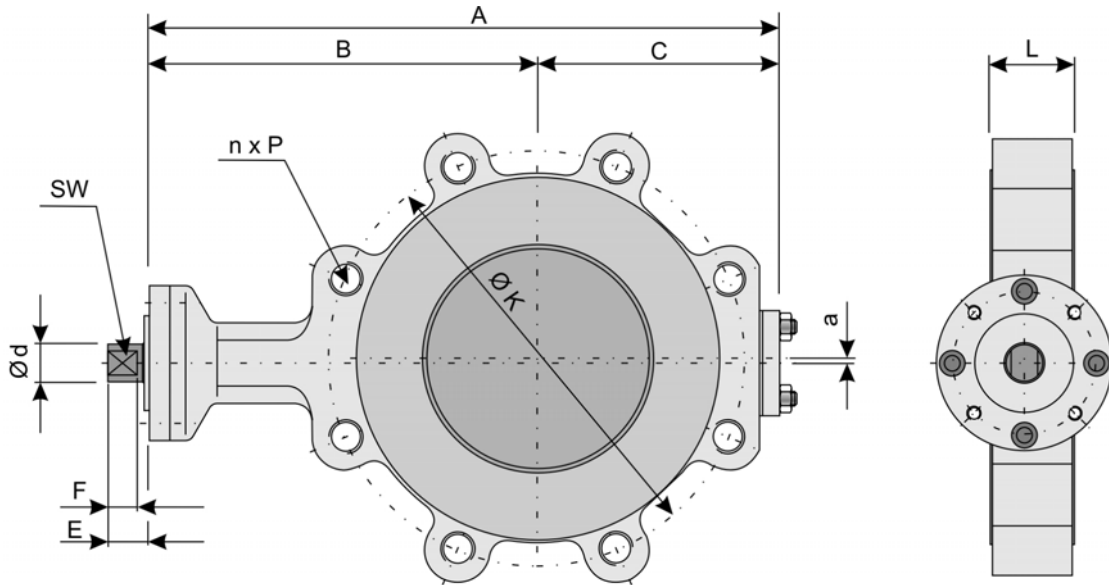


Fig. 5 - Butterfly Valve in Lug-Type version

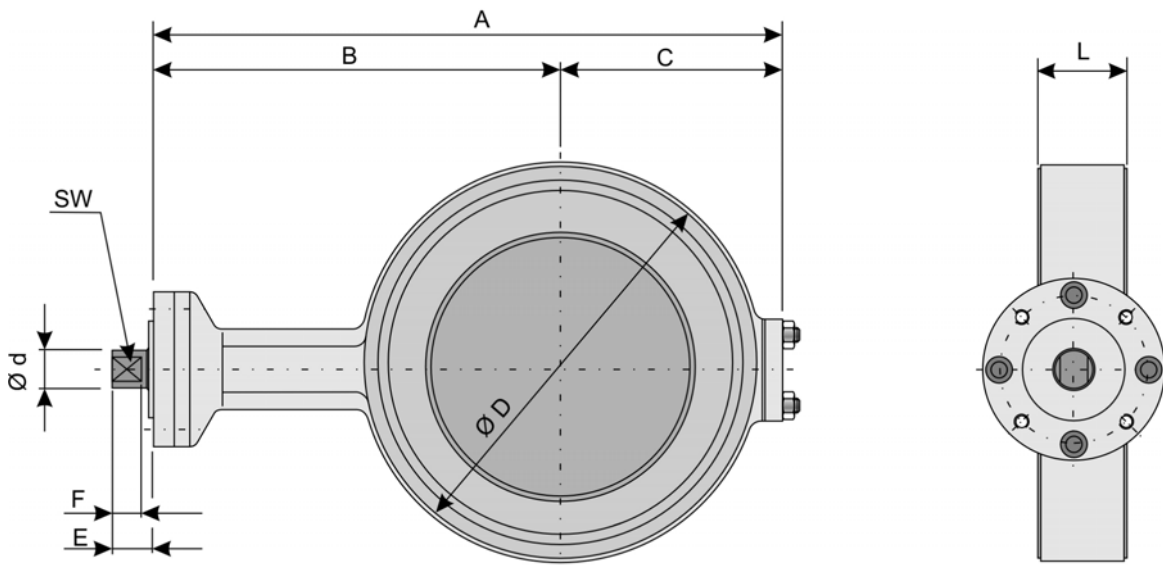


Fig. 6 - Butterfly Valve in Wafer-Type version

| DN | 80 / 3" | 100 / 4" | 150 / 6" | 200 / 8" | 250 / 10" | 300 / 12" | 350 / 14" | 400 / 16" | 500 / 20" | |
|-------------------------|---------------------------------------|----------|----------|-----------|-----------|-----------|------------|-----------|------------|------------|
| L | API 609*) Class 150 + PN 10 / 40 | 46 | 52 | 56 | 60 | 68 | 78 | 78 | 102 | 127 |
| | Series 25, PN10 / 40 + (Class 150) | 49 | 56 | 70 | 71 | 76 | 83 | 92 | 102 | 127 |
| | Series 16, Class 150/300 + PN 10 / 40 | 64 | 64 | 76 | 89 | 114 | 114 | 127 | 140 | 152 |
| A | 255 | 278 | 366 | 441 | 496 | 544 | 668 | 676 | 845,5 | |
| B | 160 | 170 | 225 | 277 | 262 | 300 | 360 | 376 | 465 | |
| C | 95 | 108 | 141 | 164 | 234 | 244 | 308 | 300 | 380,5 | |
| a | 1,6 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | |
| Ø D (only Wafer-Type) | 142 | 160 | 217 | 272 | 326 | 378 | 438 | 485 | 594 | |
| Ø K | Class 150 | 152,4 | 190,5 | 241,3 | 298,5 | 362 | 431,8 | 476,3 | 539,8 | 635 |
| | Class 300 | 168,1 | 200,2 | 269,7 | 330,2 | 387,4 | 450,9 | 514,4 | 571,5 | 685,8 |
| | PN 10 | 160 | 180 | 240 | 295 | 350 | 400 | 460 | 515 | 620 |
| | PN 16 | 160 | 180 | 240 | 295 | 355 | 410 | 470 | 525 | 650 |
| | PN 25 | 160 | 190 | 250 | 310 | 370 | 430 | 490 | 550 | 660 |
| | PN 40 | 160 | 190 | 250 | 320 | 385 | 450 | 510 | 585 | 670 |
| n x Ø P Wafer-Type | Class 150 | 4 x 19,1 | 8 x 19,1 | 8 x 22,4 | 8 x 22,4 | 12 x 25,4 | 12 x 25,4 | 12 x 28,4 | 16 x 28,4 | 20 x 31,8 |
| | Class 300 | 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 | 16 x 35,1 | 24 x 35,1 |
| | 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 | 20 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 | 20 x 33 |
| | 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 | 20 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 | 20 x 42 |
| n x P Lug-Type | Class 150 | 4 x 5/8" | 8 x 5/8" | 8 x 3/4" | 8 x 3/4" | 12 x 7/8" | 12 x 1" | 12 x 1" | 16 x 11/8" | 20 x 11/8" |
| | Class 300 | 8 x 3/4" | 8 x 3/4" | 12 x 3/4" | 12 x 7/8" | 16 x 1" | 16 x 11/4" | 20x13/16" | 20 x 13/8" | 24 x 11/4" |
| | 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 | 20 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 | 20 x M30 |
| | 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 | 20 x M33 |
| | PN 40 | 8 x M16 | 8 x M20 | 8 x M24 | 12 x M27 | 12 x M27 | 16 x M30 | 16 x M33 | 16 x M36 | 20 x M39 |
| E | 19 | 19 | 22 | 26 | 26 | 31 | 31 | 37 | 43 | |
| F | 14 | 14 | 17 | 19 | 19 | 24 | 24 | 30 | 34 | |
| Ø d | 18 | 18 | 22 | 26 | 26 | 33 | 39 | 42 | 54 | |
| SW | 14 | 14 | 17 | 19 | 19 | 24 | 24 | 30 | 34 | |
| DIN ISO Connection | F05 | F05 | F07 | F10 | F10 | F12 | F12 | F14 | F16 | |
| Weight ca. kg | 7 | 10 | 18 | 28 | 42 | 66 | 100 | 120 | 220 | |

Table 2 - Dimensions in mm and weights in kg

*) API 609 corresponds to line 20

High Performance Butterfly Valve Series 14b / 14c

Technical Data:

| | | | |
|-------------------------------|--|--|-------------------------------------|
| Nominal size | 3" to 20" as well as DN 80 to 500 | | |
| Nominal pressure | ANSI Class 150 and 300 as well as PN 10 to 40 | | |
| Body style | Lug-Type or Wafer-Type | | |
| Seat ring | soft sealing | | metal sealing |
| | PTFE - live loaded | R-PTFE | |
| Temperature range | -76°F - 410°F (-60°C - 210°C) | -76°F - 446°F (-60°C - 230°C) | -76°F - 662°F (-60°C - 350°C) |
| Leakage for direction of flow | On request as it depends on pressure and temperature | | |
| | direction of flow A | Leakage rate A acc. to DIN EN 12266-1, P12 | Leakage rate VI acc. to DIN EN 1349 |
| Rangeability | 50 : 1 | | |
| Face to face | ANSI | Class 150: acc. to API 609 (DIN EN 558-2, Series 20) Class 300: acc. to EN 558-2, Series 16 | |
| | DIN | acc. to DIN EN 558-1, Series 20 Special version: acc. to DIN EN 558-1, Series 25, 16 | |
| Perm. operating pressures | See pressure-temperature diagram | | |

Table 3 - technical data

Materials:

| Version | ANSI | DIN | |
|---------------------|---|-----------------------------------|---------------------|
| Valve body | Cast iron | A 351 CF8M / A 216 WCB | 1.4408/ 1.0619 |
| | Full-mold cast | A 240 Gr. 316L / A 516 Gr.70 etc. | 1.4571/ 1.0570 etc. |
| Butterfly disc | A 351 CF8M | 1.4408 | |
| Shaft | A 182 F51 | 1.4462 / | |
| | AISI 630 / H1150D | 1.4542 / H1150 | |
| Fastening ring | A479 F316Ti | 1.4571 | |
| Stuffing box flange | A479 F316Ti | 1.4571 | |
| Seat ring | soft | PTFE-live loaded / R-PTFE | |
| | metal | Nickel | |
| Packing | PTFE - V-ring-packing with cup springs of 1.8159, Delta Tone coated | | |

Table 4 - Materials

Body version, materials and related temperature ranges:

| Butterfly valve version and body material | Shaft material and seat sealing AISI 630 / H1150D | | | |
|---|--|----------------------------------|----------------------------------|----------------------------------|
| | PTFE - soft sealing | | HT-metal sealing | |
| | PTFE - live loaded | R - PTFE | | |
| Series 14b Cast iron | A 351 CF8M | -76 bis 410°F (-60 bis 210°C) | -76 bis 446°F (-60 bis 230°C) | -76 bis 572°F (-60 bis 300°C) |
| | A 216 WCB | 14 bis 410°F (-10 bis 210°C) | 14 bis 446°F (-10 bis 230°C) | 14 bis 572°F (-10 bis 300°C) |
| | 1.4408 | -76 to 410°F (-60 bis 210°C) | -76 bis 446°F (-60 bis 230°C) | -76 bis 572°F (-60 bis 300°C) |
| | 1.0619 | 14 bis 410°F (-10 bis 210°C) | 14 bis 446°F (-10 bis 230°C) | 14 bis 662°F (-10 bis 350°C) |
| Series 14c Full-mold cast | A 240 Gr.316L | -76 bis 410°F (-60 bis 210°C) | -76 bis 446°F (-60 bis 230°C) | -76 bis 662°F (-60 bis 350°C) |
| | A 516 Gr.70 | 14 bis 410°F (-10 bis 210°C) | 14 bis 446°F (-10 bis 230°C) | 14 bis 662°F (-10 bis 350°C) |
| | S355J2G3 | 14 bis 410°F (-10 bis 210°C) | 14 bis 446°F (-10 bis 230°C) | 14 bis 662°F (-10 bis 350°C) |
| | 1.4571 | -76 bis 410°F (-60 bis 210°C) | -76 bis 446°F (-60 bis 230°C) | -76 bis 662°F (-60 bis 350°C) |

Table 5 - Body version, materials and associated temperature ranges (HT - High-temperature version)

Functional diagram with opening angles:

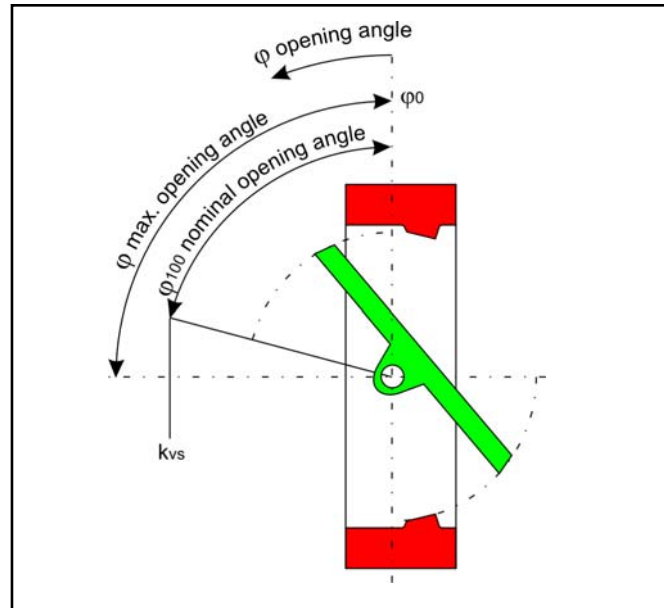


Fig. 7 - Functional diagram with opening angles

Characteristic curve:

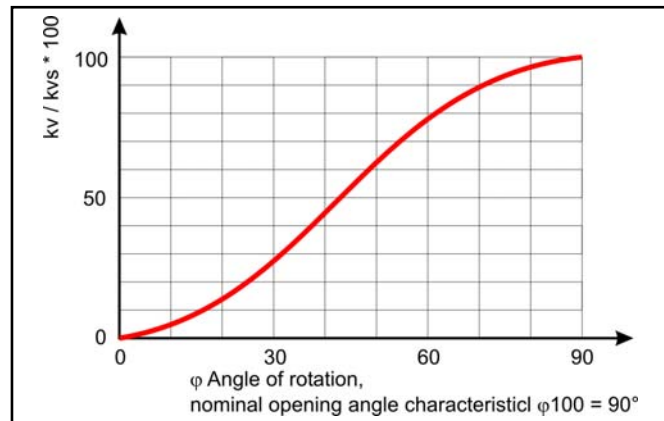


Fig. 8 - Characteristic curve

Terms for noise level calculation

| 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 |

Table 6 - noise level calculation and terms for control valve sizing

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

Correction terms:

with gases and vapors
with liquids

$$\Delta LG = 0,$$

$$\Delta LF = 0$$

Cv values and related opening angles:

| DN | φ Opening angle | | | | | | | | |
|-----------|-----------------|------|------|------|------|------|-------|-------|-------|
| | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| 3" / 80 | 5.3 | 27 | 53 | 80 | 109 | 138 | 156 | 172 | 176 |
| 4" / 100 | 8 | 42 | 84 | 126 | 174 | 222 | 250 | 275 | 281 |
| 6" / 150 | 25 | 123 | 246 | 369 | 508 | 647 | 729 | 803 | 819 |
| 8" / 200 | 49 | 243 | 488 | 731 | 1009 | 1285 | 1447 | 1594 | 1626 |
| 10" / 250 | 80 | 399 | 797 | 1196 | 1646 | 2098 | 2363 | 2602 | 2656 |
| 12" / 300 | 117 | 586 | 1172 | 1759 | 2423 | 3088 | 3478 | 3829 | 3908 |
| 16" / 400 | 214 | 1071 | 2141 | 3212 | 4425 | 5638 | 6352 | 6994 | 7137 |
| 20" / 500 | 338 | 1688 | 3377 | 5065 | 6978 | 8892 | 10018 | 11030 | 11255 |

Table 7 - Cv values

kv values and related opening angles:

| DN | φ Opening angle | | | | | | | | |
|-----------|-----------------|------|------|------|------|------|------|------|------|
| | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| 3" / 80 | 4.5 | 23 | 45 | 68 | 93 | 118 | 133 | 147 | 150 |
| 4" / 100 | 7 | 36 | 72 | 108 | 149 | 190 | 214 | 235 | 240 |
| 6" / 150 | 21 | 105 | 210 | 315 | 434 | 553 | 623 | 686 | 700 |
| 8" / 200 | 42 | 208 | 417 | 625 | 862 | 1098 | 1237 | 1362 | 1390 |
| 10" / 250 | 68 | 341 | 681 | 1022 | 1407 | 1793 | 2020 | 2224 | 2270 |
| 12" / 300 | 100 | 501 | 1002 | 1503 | 2071 | 2639 | 2973 | 3273 | 3340 |
| 16" / 400 | 183 | 915 | 1830 | 2745 | 3782 | 4819 | 5429 | 5978 | 6100 |
| 20" / 500 | 289 | 1443 | 2886 | 4329 | 5964 | 7600 | 8562 | 9427 | 9620 |

Table 8 - kv values

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.

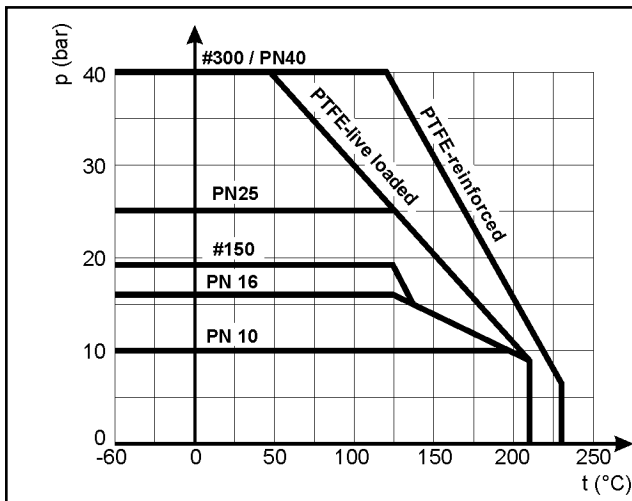


Fig. 9 - Pressure-temperature diagram (soft sealed)

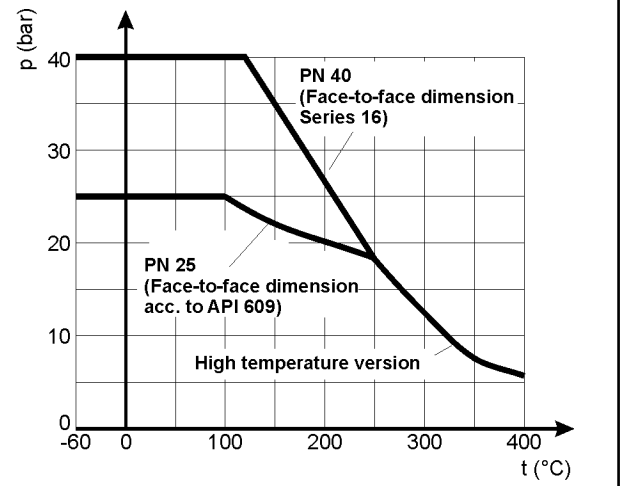


Fig. 10 - Pressure-temperature diagram (metal sealed)

Torque and breakaway torques:

| soft-sealed Butterfly Valve NS | Perm. torques M _{dmax} in Nm with shaft in A182 F51 | Breakaway torque M _{dl} in Nm with differential pressure Δp in bar (direction of flow B) | | | |
|--------------------------------|--|---|------|------|------|
| | | 0 | 5 | 10 | 16 |
| | | | | | |
| 3" / 80 | 424 | 40 | 43 | 45 | 51 |
| 4" / 100 | 424 | 48 | 54 | 59 | 67 |
| 6" / 150 | 770 | 91 | 106 | 114 | 157 |
| 8" / 200 | 1194 | 190 | 219 | 269 | 288 |
| 10" / 250 | 1194 | 320 | 364 | 433 | 480 |
| 12" / 300 | 2429 | 370 | 467 | 578 | 654 |
| 16" / 400 | 4905 | 690 | 903 | 1089 | 1239 |
| 20" / 500 | 8953 | 885 | 1180 | 1450 | 1723 |

Table 9 - max. permissible torque and breakaway torque (soft sealed , direction of flow "B")

| metal-sealed Butterfly Valve NS | Perm. torques M _{dmax} in Nm with shaft in | | | Losbrechmoment M _{dl} in Nm bei Differenzdruck Δp in bar (Anströmrichtung A) | | | | | | | |
|---------------------------------|---|----------|-------------------|---|------|------|------|------|-----|-----|-----|
| | A182 F51 | AISI 630 | AISI 630 / H1150D | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |
| | | | | | | | | | | | |
| 3" / 80 | 424 | 943 | 679 | 32 | 32 | 46 | 56 | 73 | 79 | 103 | 125 |
| 4" / 100 | 424 | 943 | 679 | 43 | 51 | 73 | 89 | 116 | 126 | 164 | 199 |
| 6" / 150 | 770 | 1710 | 1231 | 60 | 127 | 183 | 222 | 290 | 316 | 410 | 500 |
| 8" / 200 | 1194 | 2654 | 1911 | 82 | 241 | 348 | 422 | 551 | 600 | 779 | 950 |
| 10" / 250 | 1194 | 2654 | 1911 | 189 | 473 | 683 | 857 | 1224 | - | - | - |
| 12" / 300 | 2429 | 5398 | 3886 | 357 | 609 | 893 | 1301 | - | - | - | - |
| 16" / 400 | 4905 | 10900 | 7848 | 523 | 1024 | 1638 | - | - | - | - | - |
| 20" / 500 | 8953 | 19895 | 14325 | 2616 | 3280 | 3700 | - | - | - | - | - |

Table 10- max. permissible torque and breakaway torque (metal sealed , direction of flow "A")

The breakaway torques specified 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.

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.



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.

Ordering text:

High-Performance butterfly valve Series 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 | |

For your special requirements, please contact our technical sales department.

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Values subject to change