



## Steel expansion joint - Type SF-10

Axial expansion joint DN 15 – DN 2800



DN 15 -  
DN 500



DN 600 -  
DN 2800

### Structure type SF-10

- ☐ Vacuum-proof, short-length axial expansion joint, consisting of a stainless steel bellows and rotatable flanges

### Steel bellows PN 2.5 / PN 6 / PN 10 / PN 16

- ☐ Multiple convolution bellows in various stainless steel grades
- ☐ One ply or multi-ply structure
- ☐ DN 15 – DN 500 with flared ends
- ☐ DN 600 – DN 2800 with pre-welded flared ends

| Material grade *     | Material No. as per DIN EN | Temperature**            | Possible uses                                                            |
|----------------------|----------------------------|--------------------------|--------------------------------------------------------------------------|
| Stainless steel      | 1.4541                     | -196 °C<br>up to +550 °C | Low temperature, acids, lyes, gases, fertilizers                         |
|                      | 1.4404, 1.4571             | +550 °C                  | Media containing chloride, oil, soap, drinking water, food stuff, petrol |
| Heat-resistant steel | 1.4828                     | +900 °C                  | Hot gases, steam, air                                                    |
|                      | 1.4878                     | +800 °C                  | Hot gases, steam, air                                                    |
| Nickel-based alloy   | 2.4858<br>(Incoloy 825)    | +450 °C                  | Sulphuric acid, phosphoric acid, petrol, oil, gases                      |

\* Check or inquire about the resistance of material grades to temperature and medium.  
\*\* Check or inquire about reduction in pressure by temperature.

### Flanges

#### Version

- ☐ Rotatable flanges
- ☐ Flange drilling for through bolts

#### Dimensions

Standard: DN 1200 - DN 2800 (PN 2.5)  
DN 300 - DN 2000 (PN 6)  
DN 15 - DN 1000 (PN 10)  
DN 15 - DN 500 (PN 16)  
according to EN 1092

Others: DIN EN, ANSI, BS etc.

Connection dimensions see technical annex

#### Materials

Standard: 1.0038 (S235JR), 1.4541, 1.4404

Others: stainless steel, etc.

#### Corrosion protection

Standard: DN 32 - DN 250 electro-galvanized,  
DN 300 - DN 2800 anti-corrosion primed

Others: hot-dip galvanized, special varnish, special coating etc.

### Note

Please comply with the general technical instructions regarding reaction force, moving force, fixed point load, installation instructions, etc.

Subject to technical alterations and deviations resulting from the manufacturing process.

### Applications

- for compensating axial movement
- for reducing tension, damping noise and oscillation in pipes and their system components, e.g.
  - pumps
  - motors
  - machines
- for installation in
  - industrial applications
  - gas and water supply
  - exhaust systems
  - heating installations
  - drinking water systems
- to compensate for installation inaccuracies

### Special designs

Other sizes (DN), lengths or pressure ratings on request.

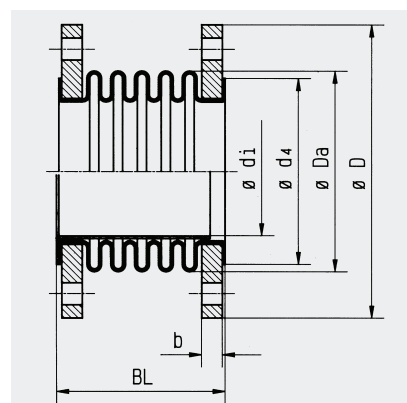
### Accessories

- ☐ Internal guide sleeve
- ☐ Protective tube
- ☐ Gas sealings for DVGW-application

### Certificates

- ☐ CE (DGR 97/23/EG)
- ☐ American Bureau of Shipping
- ☐ Bureau Veritas
- ☐ DVGW (DN 32 - DN 200)
- ☐ Germanischer Lloyd
- ☐ Lloyd's Register of Shipping
- ☐ RINA
- ☐ RMRS

### Version



Type SF-10



Pressure rate **PN 2.5** standard program

| DN   | BL  | $\Delta a_{x_{tot}}$<br>Axial<br>movement | $C_{ax}$<br>Axial<br>spring<br>rate<br>N/mm | $\Delta lat_{tot}$<br>Lateral<br>movement | $C_{lat}$<br>Lateral<br>spring<br>rate<br>N/mm | A*<br>Effective<br>bellows cross<br>sectional area<br>cm <sup>2</sup> | $\phi d_4$<br>Flared<br>end $\phi$<br>mm | $\phi D_a$<br>Bellows<br>outer<br>$\phi$<br>mm | PN<br>Flange<br>connec-<br>tion<br>EN 1092 | $\phi D$<br>Flange<br>outer<br>$\phi$<br>mm | b<br>Flange<br>thickness<br>mm | Weight<br><br>approx.<br>kg |
|------|-----|-------------------------------------------|---------------------------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------|------------------------------------------------|--------------------------------------------|---------------------------------------------|--------------------------------|-----------------------------|
| 25   | 105 | 25                                        | 28                                          | 13                                        | 10                                             | 10                                                                    | 68                                       | 42                                             | 16                                         | 115                                         | 16                             | 3.9                         |
| 32   | 135 | 30                                        | 15                                          | 26                                        | 8                                              | 15                                                                    | 56                                       | 51                                             | 16                                         | 140                                         | 18                             | 3.8                         |
| 40   | 135 | 30                                        | 17                                          | 20                                        | 15                                             | 22                                                                    | 65                                       | 61                                             | 16                                         | 150                                         | 18                             | 3.9                         |
| 50   | 160 | 44                                        | 16                                          | 34                                        | 12                                             | 34                                                                    | 80                                       | 76                                             | 16                                         | 165                                         | 18                             | 5.3                         |
| 65   | 175 | 56                                        | 25                                          | 26                                        | 18                                             | 55                                                                    | 95                                       | 96                                             | 16                                         | 185                                         | 18                             | 7.0                         |
| 80   | 190 | 68                                        | 20                                          | 28                                        | 18                                             | 78                                                                    | 110                                      | 114                                            | 16                                         | 200                                         | 20                             | 7.9                         |
| 100  | 195 | 70                                        | 19                                          | 26                                        | 22                                             | 114                                                                   | 140                                      | 136                                            | 16                                         | 220                                         | 20                             | 10.0                        |
| 125  | 200 | 72                                        | 26                                          | 21                                        | 49                                             | 174                                                                   | 165                                      | 168                                            | 16                                         | 250                                         | 22                             | 12.3                        |
| 150  | 220 | 80                                        | 28                                          | 21                                        | 62                                             | 246                                                                   | 200                                      | 197                                            | 16                                         | 285                                         | 24                             | 16.1                        |
| 200  | 230 | 86                                        | 36                                          | 19                                        | 118                                            | 424                                                                   | 254                                      | 253                                            | 10                                         | 340                                         | 24                             | 20.7                        |
| 250  | 245 | 96                                        | 50                                          | 19                                        | 208                                            | 622                                                                   | 310                                      | 302                                            | 10                                         | 395                                         | 26                             | 26.1                        |
| 300  | 180 | 48                                        | 119                                         | -                                         | -                                              | 990                                                                   | 364                                      | 386                                            | 6                                          | 440                                         | 24                             | 27.0                        |
| 300  | 265 | 98                                        | 60                                          | 14                                        | 399                                            | 990                                                                   | 364                                      | 386                                            | 6                                          | 440                                         | 24                             | 30.0                        |
| 350  | 185 | 48                                        | 129                                         | -                                         | -                                              | 1176                                                                  | 396                                      | 418                                            | 6                                          | 490                                         | 26                             | 38.0                        |
| 350  | 270 | 96                                        | 65                                          | 14                                        | 515                                            | 1176                                                                  | 396                                      | 418                                            | 6                                          | 490                                         | 26                             | 40.0                        |
| 400  | 185 | 46                                        | 146                                         | -                                         | -                                              | 1507                                                                  | 452                                      | 469                                            | 6                                          | 540                                         | 28                             | 44.0                        |
| 400  | 270 | 94                                        | 73                                          | 12                                        | 744                                            | 1507                                                                  | 452                                      | 469                                            | 6                                          | 540                                         | 28                             | 47.0                        |
| 450  | 190 | 46                                        | 162                                         | -                                         | -                                              | 1878                                                                  | 498                                      | 520                                            | 6                                          | 595                                         | 30                             | 54.0                        |
| 450  | 275 | 92                                        | 81                                          | 10                                        | 1032                                           | 1878                                                                  | 498                                      | 520                                            | 6                                          | 595                                         | 30                             | 57.0                        |
| 500  | 190 | 44                                        | 178                                         | -                                         | -                                              | 2282                                                                  | 548                                      | 570                                            | 6                                          | 645                                         | 30                             | 58.0                        |
| 500  | 275 | 90                                        | 89                                          | 8                                         | 1378                                           | 2282                                                                  | 548                                      | 570                                            | 6                                          | 645                                         | 30                             | 62.0                        |
| 600  | 195 | 44                                        | 212                                         | -                                         | -                                              | 3227                                                                  | 670                                      | 672                                            | 6                                          | 755                                         | 32                             | 77.0                        |
| 600  | 280 | 88                                        | 106                                         | 7                                         | 2315                                           | 3227                                                                  | 670                                      | 672                                            | 6                                          | 755                                         | 32                             | 81.0                        |
| 700  | 210 | 44                                        | 246                                         | -                                         | -                                              | 4336                                                                  | 775                                      | 774                                            | 6                                          | 860                                         | 40                             | 111.0                       |
| 700  | 295 | 88                                        | 123                                         | -                                         | -                                              | 4336                                                                  | 775                                      | 774                                            | 6                                          | 860                                         | 40                             | 116.0                       |
| 800  | 220 | 42                                        | 279                                         | -                                         | -                                              | 5595                                                                  | 875                                      | 875                                            | 6                                          | 975                                         | 44                             | 150.0                       |
| 800  | 305 | 86                                        | 140                                         | -                                         | -                                              | 5595                                                                  | 875                                      | 875                                            | 6                                          | 975                                         | 44                             | 156.0                       |
| 900  | 225 | 42                                        | 313                                         | -                                         | -                                              | 7014                                                                  | 975                                      | 976                                            | 6                                          | 1075                                        | 48                             | 182.0                       |
| 900  | 310 | 86                                        | 156                                         | -                                         | -                                              | 7014                                                                  | 975                                      | 976                                            | 6                                          | 1075                                        | 48                             | 188.0                       |
| 1000 | 235 | 42                                        | 346                                         | -                                         | -                                              | 8610                                                                  | 1080                                     | 1078                                           | 6                                          | 1175                                        | 52                             | 212.0                       |
| 1000 | 320 | 86                                        | 173                                         | -                                         | -                                              | 8610                                                                  | 1080                                     | 1078                                           | 6                                          | 1175                                        | 52                             | 220.0                       |
| 1200 | 210 | 42                                        | 413                                         | -                                         | -                                              | 12291                                                                 | 1262                                     | 1282                                           | 2.5                                        | 1375                                        | 30                             | 152.0                       |
| 1200 | 295 | 84                                        | 207                                         | -                                         | -                                              | 12291                                                                 | 1262                                     | 1282                                           | 2.5                                        | 1375                                        | 30                             | 160.0                       |
| 1400 | 210 | 42                                        | 478                                         | -                                         | -                                              | 16536                                                                 | 1462                                     | 1482                                           | 2.5                                        | 1575                                        | 30                             | 175.0                       |
| 1400 | 295 | 84                                        | 239                                         | -                                         | -                                              | 16536                                                                 | 1462                                     | 1482                                           | 2.5                                        | 1575                                        | 30                             | 185.0                       |
| 1600 | 210 | 42                                        | 543                                         | -                                         | -                                              | 21408                                                                 | 1662                                     | 1682                                           | 2.5                                        | 1790                                        | 30                             | 219.0                       |
| 1600 | 295 | 84                                        | 271                                         | -                                         | -                                              | 21408                                                                 | 1662                                     | 1682                                           | 2.5                                        | 1790                                        | 30                             | 231.0                       |
| 1800 | 210 | 42                                        | 607                                         | -                                         | -                                              | 26909                                                                 | 1862                                     | 1882                                           | 2.5                                        | 1990                                        | 30                             | 245.0                       |
| 1800 | 295 | 84                                        | 304                                         | -                                         | -                                              | 26909                                                                 | 1862                                     | 1882                                           | 2.5                                        | 1990                                        | 30                             | 258.0                       |
| 2000 | 210 | 42                                        | 672                                         | -                                         | -                                              | 33039                                                                 | 2062                                     | 2082                                           | 2.5                                        | 2190                                        | 30                             | 271.0                       |
| 2000 | 295 | 84                                        | 336                                         | -                                         | -                                              | 33039                                                                 | 2062                                     | 2082                                           | 2.5                                        | 2190                                        | 30                             | 285.0                       |
| 2200 | 210 | 42                                        | 736                                         | -                                         | -                                              | 39796                                                                 | 2262                                     | 2282                                           | 2.5                                        | 2405                                        | 35                             | 365.0                       |
| 2200 | 295 | 84                                        | 368                                         | -                                         | -                                              | 39796                                                                 | 2262                                     | 2282                                           | 2.5                                        | 2405                                        | 35                             | 381.0                       |
| 2400 | 210 | 42                                        | 800                                         | -                                         | -                                              | 47182                                                                 | 2462                                     | 2482                                           | 2.5                                        | 2605                                        | 35                             | 387.0                       |
| 2400 | 295 | 84                                        | 400                                         | -                                         | -                                              | 47182                                                                 | 2462                                     | 2482                                           | 2.5                                        | 2605                                        | 35                             | 414.0                       |
| 2800 | 210 | 42                                        | 928                                         | -                                         | -                                              | 63839                                                                 | 2862                                     | 2882                                           | 2.5                                        | 3030                                        | 35                             | 520.0                       |
| 2800 | 295 | 84                                        | 464                                         | -                                         | -                                              | 63839                                                                 | 2862                                     | 2882                                           | 2.5                                        | 3030                                        | 35                             | 540.0                       |

Table values refer to +20 °C, bellows material 1.4541, 1000 cycles. Please inquire for deviating values.

For pure axial movement: inner diameter of internal guide sleeve mentioned in tables PN 6, PN 10, PN 16.

If  $\Delta a_x$  and  $\Delta lat$  occur simultaneously, the table values must be reduced accordingly. The sum of all shares must not exceed 100 %.

\*Effective bellows cross sectional area is a theoretical value.



## Steel expansion joint - Type SF-10

### Axial expansion joint

| Pressure rate |     | PN 6                                                  |                                       | standard program                                                      |                                          |                                                |                                                        |                                       |                                             |                                |                         |
|---------------|-----|-------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------|------------------------------------------|------------------------------------------------|--------------------------------------------------------|---------------------------------------|---------------------------------------------|--------------------------------|-------------------------|
| DN            | BL  | $\Delta a_{x_{tot}}$<br>Axial<br>spring<br>rate<br>mm | $C_{ax}$<br>Axial<br>movement<br>N/mm | A*<br>Effective<br>bellows cross<br>sectional area<br>cm <sup>2</sup> | $\phi d_4$<br>Flared<br>end $\phi$<br>mm | $\phi D_a$<br>Bellows<br>outer<br>$\phi$<br>mm | $\phi d_i$<br>Internal<br>guide<br>sleeve $\phi$<br>mm | PN<br>Flange<br>connection<br>EN 1092 | $\phi D$<br>Flange<br>outer<br>$\phi$<br>mm | b<br>Flange<br>thickness<br>mm | Weight<br>approx.<br>kg |
| 300           | 195 | 28                                                    | 455                                   | 993                                                                   | 364                                      | 387                                            | 310                                                    | 6                                     | 440                                         | 24                             | 29.0                    |
| 300           | 290 | 58                                                    | 228                                   | 993                                                                   | 364                                      | 387                                            | 310                                                    | 6                                     | 440                                         | 24                             | 33.0                    |
| 350           | 200 | 28                                                    | 496                                   | 1180                                                                  | 396                                      | 419                                            | 342                                                    | 6                                     | 490                                         | 26                             | 40.0                    |
| 350           | 295 | 58                                                    | 248                                   | 1180                                                                  | 396                                      | 419                                            | 342                                                    | 6                                     | 490                                         | 26                             | 44.0                    |
| 400           | 200 | 28                                                    | 564                                   | 1511                                                                  | 452                                      | 470                                            | 393                                                    | 6                                     | 540                                         | 28                             | 47.0                    |
| 400           | 300 | 56                                                    | 282                                   | 1511                                                                  | 452                                      | 470                                            | 393                                                    | 6                                     | 540                                         | 28                             | 51.0                    |
| 450           | 205 | 28                                                    | 632                                   | 1883                                                                  | 498                                      | 521                                            | 444                                                    | 6                                     | 595                                         | 30                             | 57.0                    |
| 450           | 305 | 56                                                    | 316                                   | 1883                                                                  | 498                                      | 521                                            | 444                                                    | 6                                     | 595                                         | 30                             | 62.0                    |
| 500           | 205 | 28                                                    | 699                                   | 2287                                                                  | 548                                      | 571                                            | 494                                                    | 6                                     | 645                                         | 30                             | 62.0                    |
| 500           | 305 | 56                                                    | 350                                   | 2287                                                                  | 548                                      | 571                                            | 494                                                    | 6                                     | 645                                         | 30                             | 68.0                    |
| 600           | 210 | 28                                                    | 835                                   | 3233                                                                  | 670                                      | 673                                            | 596                                                    | 6                                     | 755                                         | 32                             | 81.0                    |
| 600           | 310 | 56                                                    | 418                                   | 3233                                                                  | 670                                      | 673                                            | 596                                                    | 6                                     | 755                                         | 32                             | 88.0                    |
| 700           | 230 | 27                                                    | 970                                   | 4343                                                                  | 775                                      | 775                                            | 698                                                    | 6                                     | 860                                         | 40                             | 116.0                   |
| 700           | 325 | 54                                                    | 485                                   | 4343                                                                  | 775                                      | 775                                            | 698                                                    | 6                                     | 860                                         | 40                             | 124.0                   |
| 800           | 225 | 27                                                    | 1104                                  | 5603                                                                  | 857                                      | 876                                            | 795                                                    | 6                                     | 975                                         | 30                             | 112.0                   |
| 800           | 320 | 55                                                    | 552                                   | 5603                                                                  | 857                                      | 876                                            | 795                                                    | 6                                     | 975                                         | 30                             | 121.0                   |
| 900           | 225 | 27                                                    | 1236                                  | 7023                                                                  | 958                                      | 977                                            | 896                                                    | 6                                     | 1075                                        | 30                             | 125.0                   |
| 900           | 320 | 54                                                    | 618                                   | 7023                                                                  | 958                                      | 977                                            | 896                                                    | 6                                     | 1075                                        | 30                             | 135.0                   |
| 1000          | 225 | 27                                                    | 1369                                  | 8619                                                                  | 1060                                     | 1079                                           | 998                                                    | 6                                     | 1175                                        | 30                             | 135.0                   |
| 1000          | 320 | 54                                                    | 685                                   | 8619                                                                  | 1060                                     | 1079                                           | 998                                                    | 6                                     | 1175                                        | 30                             | 147.0                   |
| 1200          | 225 | 27                                                    | 1634                                  | 12303                                                                 | 1264                                     | 1283                                           | 1202                                                   | 6                                     | 1405                                        | 30                             | 186.0                   |
| 1200          | 320 | 54                                                    | 817                                   | 12303                                                                 | 1264                                     | 1283                                           | 1202                                                   | 6                                     | 1405                                        | 30                             | 200.0                   |
| 1400          | 225 | 27                                                    | 1894                                  | 16549                                                                 | 1464                                     | 1483                                           | 1402                                                   | 6                                     | 1630                                        | 35                             | 275.0                   |
| 1400          | 320 | 54                                                    | 947                                   | 16549                                                                 | 1464                                     | 1483                                           | 1402                                                   | 6                                     | 1630                                        | 35                             | 291.0                   |
| 1600          | 225 | 27                                                    | 2152                                  | 21424                                                                 | 1664                                     | 1683                                           | 1602                                                   | 6                                     | 1830                                        | 35                             | 312.0                   |
| 1600          | 320 | 54                                                    | 1076                                  | 21424                                                                 | 1664                                     | 1683                                           | 1602                                                   | 6                                     | 1830                                        | 35                             | 331.0                   |
| 1800          | 225 | 27                                                    | 2410                                  | 26927                                                                 | 1864                                     | 1883                                           | 1802                                                   | 6                                     | 2045                                        | 35                             | 371.0                   |
| 1800          | 320 | 54                                                    | 1205                                  | 26927                                                                 | 1864                                     | 1883                                           | 1802                                                   | 6                                     | 2045                                        | 35                             | 392.0                   |
| 2000          | 225 | 27                                                    | 2667                                  | 33058                                                                 | 2064                                     | 2083                                           | 2002                                                   | 6                                     | 2265                                        | 35                             | 444.0                   |
| 2000          | 320 | 54                                                    | 1334                                  | 33058                                                                 | 2064                                     | 2083                                           | 2002                                                   | 6                                     | 2265                                        | 35                             | 467.0                   |

Table values refer to +20 °C, bellows material 1.4541, 1000 cycles. Please inquire for deviating values.

\*Effective bellows cross sectional area is a theoretical value.



**Pressure rate** **PN 10** **standard program**

| DN   | BL  | $\Delta a_{x_{tot}}$<br>Axial<br>movement | $C_{ax}$<br>Axial<br>spring<br>rate | A*<br>Effective<br>bellows cross<br>sectional area | $\phi d_4$<br>Flared<br>end<br>$\phi$ | $\phi D_a$<br>Bellows<br>outer<br>$\phi$ | $\phi d_i$<br>Internal<br>guide<br>sleeve $\phi$ | PN<br>Flange<br>connection | $\phi D$<br>Flange<br>outer<br>$\phi$ | b<br>Flange<br>thickness | Weight<br>approx.<br>kg |
|------|-----|-------------------------------------------|-------------------------------------|----------------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------|----------------------------|---------------------------------------|--------------------------|-------------------------|
|      | mm  | mm                                        | N/mm                                | cm <sup>2</sup>                                    | mm                                    | mm                                       | mm                                               | EN 1092                    | mm                                    | mm                       |                         |
| 15   | 108 | 17                                        | 21                                  | 7                                                  | 45                                    | 38                                       | 18                                               | 16                         | 95                                    | 14                       | 1.5                     |
| 20   | 108 | 17                                        | 21                                  | 7                                                  | 58                                    | 38                                       | 18                                               | 16                         | 105                                   | 16                       | 2.1                     |
| 25   | 125 | 26                                        | 49                                  | 16                                                 | 54                                    | 54                                       | 25                                               | 16                         | 115                                   | 16                       | 2.4                     |
| 32   | 135 | 26                                        | 49                                  | 16                                                 | 54                                    | 54                                       | 32                                               | 16                         | 140                                   | 18                       | 4.0                     |
| 40   | 135 | 30                                        | 111                                 | 25                                                 | 68                                    | 66                                       | 38                                               | 16                         | 150                                   | 18                       | 4.5                     |
| 50   | 155 | 36                                        | 177                                 | 34                                                 | 75                                    | 79                                       | 49                                               | 16                         | 165                                   | 18                       | 5.5                     |
| 65   | 165 | 40                                        | 199                                 | 54                                                 | 95                                    | 96                                       | 63                                               | 16                         | 185                                   | 18                       | 7.4                     |
| 80   | 175 | 46                                        | 148                                 | 78                                                 | 110                                   | 115                                      | 76                                               | 16                         | 200                                   | 20                       | 8.4                     |
| 100  | 180 | 46                                        | 175                                 | 115                                                | 140                                   | 137                                      | 96                                               | 16                         | 220                                   | 20                       | 10.1                    |
| 125  | 200 | 50                                        | 79                                  | 173                                                | 165                                   | 168                                      | 123                                              | 16                         | 250                                   | 22                       | 13.2                    |
| 150  | 230 | 50                                        | 160                                 | 243                                                | 200                                   | 197                                      | 148                                              | 16                         | 285                                   | 24                       | 17.3                    |
| 200  | 230 | 38                                        | 219                                 | 422                                                | 254                                   | 253                                      | 198                                              | 10                         | 340                                   | 24                       | 22.1                    |
| 250  | 245 | 38                                        | 624                                 | 620                                                | 310                                   | 302                                      | 249                                              | 10                         | 395                                   | 26                       | 28.6                    |
| 300  | 200 | 28                                        | 455                                 | 993                                                | 364                                   | 387                                      | 310                                              | 10                         | 445                                   | 26                       | 33.0                    |
| 300  | 295 | 56                                        | 288                                 | 993                                                | 364                                   | 387                                      | 310                                              | 10                         | 445                                   | 26                       | 36.0                    |
| 350  | 205 | 27                                        | 496                                 | 1180                                               | 396                                   | 419                                      | 342                                              | 10                         | 505                                   | 30                       | 50.0                    |
| 350  | 305 | 54                                        | 248                                 | 1180                                               | 396                                   | 419                                      | 342                                              | 10                         | 505                                   | 30                       | 54.0                    |
| 400  | 210 | 27                                        | 564                                 | 1511                                               | 452                                   | 470                                      | 393                                              | 10                         | 565                                   | 32                       | 62.0                    |
| 400  | 310 | 54                                        | 282                                 | 1511                                               | 452                                   | 470                                      | 393                                              | 10                         | 565                                   | 32                       | 67.0                    |
| 450  | 220 | 27                                        | 632                                 | 1883                                               | 498                                   | 521                                      | 444                                              | 10                         | 615                                   | 36                       | 76.0                    |
| 450  | 315 | 54                                        | 316                                 | 1883                                               | 498                                   | 521                                      | 444                                              | 10                         | 615                                   | 36                       | 81.0                    |
| 500  | 225 | 26                                        | 699                                 | 2287                                               | 548                                   | 571                                      | 494                                              | 10                         | 670                                   | 38                       | 90.0                    |
| 500  | 320 | 53                                        | 350                                 | 2287                                               | 548                                   | 571                                      | 494                                              | 10                         | 670                                   | 38                       | 96.0                    |
| 600  | 225 | 26                                        | 835                                 | 3233                                               | 654                                   | 673                                      | 596                                              | 10                         | 780                                   | 30                       | 90.0                    |
| 600  | 320 | 52                                        | 418                                 | 3233                                               | 654                                   | 673                                      | 596                                              | 10                         | 780                                   | 30                       | 97.0                    |
| 700  | 225 | 26                                        | 970                                 | 4343                                               | 756                                   | 775                                      | 698                                              | 10                         | 895                                   | 30                       | 112.0                   |
| 700  | 320 | 52                                        | 485                                 | 4343                                               | 756                                   | 775                                      | 698                                              | 10                         | 895                                   | 30                       | 120.0                   |
| 800  | 225 | 25                                        | 1104                                | 5603                                               | 857                                   | 876                                      | 795                                              | 10                         | 1015                                  | 30                       | 140.0                   |
| 800  | 320 | 51                                        | 552                                 | 5603                                               | 857                                   | 876                                      | 795                                              | 10                         | 1015                                  | 30                       | 149.0                   |
| 900  | 225 | 25                                        | 1236                                | 7023                                               | 958                                   | 977                                      | 896                                              | 10                         | 1115                                  | 30                       | 154.0                   |
| 900  | 320 | 51                                        | 618                                 | 7023                                               | 958                                   | 977                                      | 896                                              | 10                         | 1115                                  | 30                       | 164.0                   |
| 1000 | 225 | 25                                        | 1369                                | 8619                                               | 1060                                  | 1078                                     | 998                                              | 10                         | 1230                                  | 35                       | 205.0                   |
| 1000 | 320 | 50                                        | 685                                 | 8619                                               | 1060                                  | 1078                                     | 998                                              | 10                         | 1230                                  | 35                       | 217.0                   |

**Pressure rate** **PN 16** **standard program**

| DN  | BL  | $\Delta a_{x_{tot}}$<br>Axial<br>movement | $C_{ax}$<br>Axial<br>spring<br>rate | A*<br>Effective<br>bellows cross<br>sectional area | $\phi d_4$<br>Flared<br>end<br>$\phi$ | $\phi D_a$<br>Bellows<br>outer<br>$\phi$ | $\phi d_i$<br>Internal<br>guide<br>sleeve $\phi$ | PN<br>Flange<br>connection | $\phi D$<br>Flange<br>outer<br>$\phi$ | b<br>Flange<br>thickness | Weight<br>approx.<br>kg |
|-----|-----|-------------------------------------------|-------------------------------------|----------------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------|----------------------------|---------------------------------------|--------------------------|-------------------------|
|     | mm  | mm                                        | N/mm                                | cm <sup>2</sup>                                    | mm                                    | mm                                       | mm                                               | EN 1092                    | mm                                    | mm                       |                         |
| 15  | 108 | 17                                        | 21                                  | 7                                                  | 45                                    | 38                                       | 18                                               | 16                         | 95                                    | 14                       | 1.5                     |
| 20  | 108 | 17                                        | 21                                  | 7                                                  | 58                                    | 38                                       | 18                                               | 16                         | 105                                   | 16                       | 2.1                     |
| 25  | 125 | 26                                        | 49                                  | 16                                                 | 54                                    | 54                                       | 25                                               | 16                         | 115                                   | 16                       | 2.4                     |
| 32  | 135 | 26                                        | 49                                  | 16                                                 | 54                                    | 54                                       | 32                                               | 16                         | 140                                   | 18                       | 4.0                     |
| 40  | 135 | 30                                        | 111                                 | 25                                                 | 68                                    | 66                                       | 38                                               | 16                         | 150                                   | 18                       | 4.5                     |
| 50  | 155 | 36                                        | 177                                 | 34                                                 | 75                                    | 79                                       | 49                                               | 16                         | 165                                   | 18                       | 5.5                     |
| 65  | 165 | 40                                        | 199                                 | 54                                                 | 95                                    | 96                                       | 63                                               | 16                         | 185                                   | 18                       | 7.4                     |
| 80  | 175 | 46                                        | 148                                 | 78                                                 | 110                                   | 115                                      | 76                                               | 16                         | 200                                   | 20                       | 8.4                     |
| 100 | 180 | 46                                        | 175                                 | 115                                                | 140                                   | 137                                      | 96                                               | 16                         | 220                                   | 20                       | 10.1                    |
| 125 | 200 | 50                                        | 79                                  | 173                                                | 165                                   | 168                                      | 123                                              | 16                         | 250                                   | 22                       | 13.2                    |
| 150 | 230 | 50                                        | 160                                 | 243                                                | 200                                   | 197                                      | 148                                              | 16                         | 285                                   | 24                       | 17.3                    |
| 200 | 230 | 38                                        | 219                                 | 422                                                | 254                                   | 253                                      | 198                                              | 16                         | 340                                   | 26                       | 23.1                    |
| 250 | 245 | 38                                        | 624                                 | 620                                                | 310                                   | 302                                      | 249                                              | 16                         | 405                                   | 29                       | 33.3                    |
| 300 | 220 | 22                                        | 863                                 | 995                                                | 364                                   | 388                                      | 310                                              | 16                         | 460                                   | 32                       | 44.0                    |
| 300 | 320 | 44                                        | 432                                 | 995                                                | 364                                   | 388                                      | 310                                              | 16                         | 460                                   | 32                       | 49.0                    |
| 350 | 225 | 21                                        | 946                                 | 1182                                               | 396                                   | 420                                      | 342                                              | 16                         | 520                                   | 35                       | 63.0                    |
| 350 | 325 | 43                                        | 473                                 | 1182                                               | 396                                   | 420                                      | 342                                              | 16                         | 520                                   | 35                       | 68.0                    |
| 400 | 230 | 21                                        | 1078                                | 1514                                               | 452                                   | 471                                      | 393                                              | 16                         | 580                                   | 38                       | 80.0                    |
| 400 | 330 | 43                                        | 539                                 | 1514                                               | 452                                   | 471                                      | 393                                              | 16                         | 580                                   | 38                       | 85.0                    |
| 450 | 240 | 21                                        | 1210                                | 1886                                               | 498                                   | 522                                      | 444                                              | 16                         | 640                                   | 42                       | 101.0                   |
| 450 | 340 | 43                                        | 605                                 | 1886                                               | 498                                   | 522                                      | 444                                              | 16                         | 640                                   | 42                       | 108.0                   |
| 500 | 245 | 21                                        | 1338                                | 2290                                               | 548                                   | 572                                      | 494                                              | 16                         | 715                                   | 46                       | 140.0                   |
| 500 | 345 | 42                                        | 669                                 | 2290                                               | 548                                   | 572                                      | 494                                              | 16                         | 715                                   | 46                       | 148.0                   |

Table values refer to +20 °C, bellows material 1.4541, 1000 cycles. Max. allowable pressure pulsation of 1.0 bar (brief periods). Please inquire for deviating values. \*Effective bellows cross sectional area is a theoretical value.