

## RUBBER EXPANSION JOINT TYPE A-2, A-4

### LATERAL EXPANSION JOINT DN 20 – DN 1000



#### STRUCTURE TYPE A-2, A-4 / RUBBER BELLOWS PN 16

- **Type A-2:** Lateral expansion joint consisting of a rubber bellows with rotatable flanges and tie rods (external restraints) to absorb reaction force from internal pressure
- **Type A-4:** Lateral expansion joint consisting of a rubber bellows with rotatable flanges and tie rods (external and internal restraints) to absorb reaction force from internal pressure or vacuum
- Highly elastic molded bellows in various rubber grades
- Synthetic fibre reinforcement
- Wire-reinforced self-sealing rubber rim
- Electrical impedance  $10^3$  to  $10^6$  Ohm (DIN IEC 93, VDE 0303-30)

| Rubber grade* | EPDM                   | NBR                            | CIIR           |
|---------------|------------------------|--------------------------------|----------------|
| Colour code   | orange                 | red                            | white          |
| Possible uses | Hot water, acids, lyes | hydrocarbon containing liquids | Drinking water |

\*Check or inquire about the resistance of the rubber grade to temperature and medium

| Technical design              |  |
|-------------------------------|--|
| Max. perm. operating pressure | 16 bar*  |
| Max. perm. temperature        | +100 °C  |
| Bursting pressure             | ≥ 48 bar   |
| Vacuum operation              | DN 20 – 50 without vacuum supporting ring,<br>DN 65 – 1000 with vacuum supporting ring |

Max. operating pressure to be set 30 % lower for shock loads.

\*Please consider a decrease of pressure due to temperature (see technical annex).

#### FLANGES / VERSIONS

- Flanges with stabilizing collar and ears to carry the tie rods
- Flange drilling for through bolts
- Special machined groove for rubber rim

|                      | Standard                          |                                     | Others   |
|----------------------|-----------------------------------|-------------------------------------|--|
| Dimensions           | EN 1092                           |                                     | ANSI, BS etc. Connection dimensions see technical annex page 213 – 215 |
| Materials            | 1.0038 (S235JR)                   |                                     | 1.4571   |
| Corrosion protection | DN 20 – DN 400 electro-galvanized | DN 450 – DN 1000 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 reducing thermal and mechanical tension in pipes and their system components, e.g.
  - pumps
  - compressors
  - engines
- for muffling vibration and noise
- for compensating lateral movement
- to compensate for installation inaccuracies
- to compensate for ground and foundation settlement or tank settlement during filling

#### TIE ROD RESTRAINTS

- DN 20 – DN 150 Tie rods carried on silencing rubber sockets
- DN 175 – DN 1000 Tie rods carried on spherical washers and conical seats

#### Materials

Standard: tie rods 8.8

Others: stainless steel

#### Corrosion protection

Standard: electrogalvanized

Others: hot-dip galvanized

#### CERTIFICATES

- CE (PED 2014/68/EU)
- Bureau Veritas
- DNV GL® / DNV®
- Lloyd's Register of Shipping
- Drinking water
- TÜV Süd (KTA)
- Others see technical annex

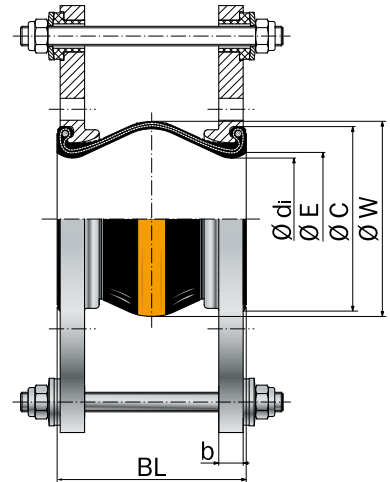
## DIMENSIONS STANDARD PROGRAM

| DN   | BL* | Pressure rate bar | Ø dj Bellows inner Ø mm | Ø C Raised face outer Ø mm | Ø E Raised face inner Ø mm | Ø W** Convolution Ø mm | PN Flange connection EN 1902 | Ø D Flange outer Ø mm | b Flange thickness mm | H Flange height mm |
|------|-----|-------------------|-------------------------|----------------------------|----------------------------|------------------------|------------------------------|-----------------------|-----------------------|--------------------|
| 20   | 100 | 16                | 22 ± 3                  | 51                         | 30                         | 55                     | 16                           | 115                   | 16                    | 195                |
| 25   | 100 | 16                | 22 ± 3                  | 51                         | 30                         | 55                     | 16                           | 115                   | 16                    | 195                |
| 32   | 125 | 16                | 31 ± 3                  | 72                         | 39                         | 78                     | 16                           | 140                   | 16                    | 220                |
| 32   | 150 | 16                | 31 ± 3                  | 72                         | 39                         | 88                     | 16                           | 140                   | 16                    | 220                |
| 40   | 125 | 16                | 39 ± 3                  | 81                         | 45                         | 86                     | 16                           | 150                   | 16                    | 230                |
| 40   | 150 | 16                | 39 ± 3                  | 81                         | 45                         | 96                     | 16                           | 150                   | 16                    | 230                |
| 50   | 125 | 16                | 49 ± 3                  | 95                         | 56                         | 97                     | 16                           | 165                   | 16                    | 240                |
| 50   | 150 | 16                | 49 ± 3                  | 95                         | 56                         | 107                    | 16                           | 165                   | 16                    | 240                |
| 65   | 125 | 16                | 65 ± 3                  | 115                        | 72                         | 113                    | 16                           | 185                   | 18                    | 260                |
| 65   | 150 | 16                | 65 ± 3                  | 115                        | 72                         | 123                    | 16                           | 185                   | 18                    | 260                |
| 80   | 150 | 16                | 77 ± 3                  | 127                        | 84                         | 135                    | 16                           | 200                   | 20                    | 300                |
| 100  | 150 | 16                | 100 ± 3                 | 151                        | 109                        | 160                    | 16                           | 220                   | 20                    | 350                |
| 125  | 150 | 16                | 127 ± 3                 | 178                        | 133                        | 184                    | 16                           | 250                   | 22                    | 385                |
| 150  | 150 | 16                | 153 ± 3                 | 206                        | 161                        | 212                    | 16                           | 285                   | 22                    | 420                |
| 175  | 150 | 16                | 176 ± 3                 | 230                        | 185                        | 236                    | 16                           | 315                   | 22                    | 440                |
| 200  | 150 | 10                | 202 ± 3                 | 260                        | 209                        | 265                    | 10                           | 340                   | 25                    | 465                |
| 200  | 175 | 10                | 202 ± 3                 | 260                        | 209                        | 265                    | 10                           | 340                   | 25                    | 465                |
| 250  | 175 | 10                | 252 ± 3                 | 313                        | 262                        | 318                    | 10                           | 395                   | 25                    | 520                |
| 250  | 200 | 10                | 252 ± 3                 | 313                        | 262                        | 318                    | 10                           | 395                   | 25                    | 520                |
| 300  | 200 | 10                | 303 ± 3                 | 363                        | 312                        | 373                    | 10                           | 445                   | 25                    | 570                |
| 350  | 200 | 10                | 344 ± 3                 | 423                        | 360                        | 420                    | 10                           | 505                   | 30                    | 630                |
| 400  | 200 | 10                | 396 ± 3                 | 474                        | 410                        | 460                    | 10                           | 565                   | 30                    | 690                |
| 450  | 250 | 10                | 435 ± 8                 | 532                        | 450                        | 575                    | 10                           | 615                   | 35                    | 795                |
| 500  | 250 | 10                | 485 ± 8                 | 584                        | 500                        | 625                    | 10                           | 670                   | 35                    | 850                |
| 600  | 250 | 10                | 585 ± 8                 | 684                        | 600                        | 725                    | 10                           | 780                   | 40                    | 960                |
| 700  | 275 | 6                 | 690 ± 10                | 800                        | 700                        | 850                    | 10                           | 895                   | 40                    | 1075               |
| 800  | 275 | 6                 | 790 ± 10                | 900                        | 800                        | 950                    | 10                           | 1015                  | 40                    | 1195               |
| 900  | 300 | 4                 | 890 ± 10                | 1008                       | 900                        | 1050                   | 10                           | 1115                  | 40                    | 1295               |
| 1000 | 300 | 4                 | 990 ± 10                | 1108                       | 1000                       | 1150                   | 10                           | 1230                  | 40                    | 1410               |

\*DN 32 to DN 300 also available in BL 130 mm as Type R-2. \*\*unpressurized. From DN 200 higher pressure rate available on request. Please contact us for further flange dimensions.

## ACCESSORIES

- Vacuum supporting ring
- Internal guide sleeve
- Flame-proof protective cover
- Protective hood
- Protective tube

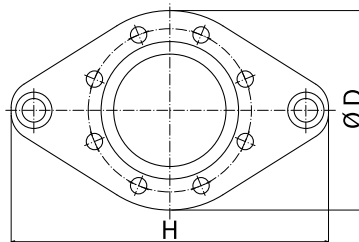


**Type A-2**

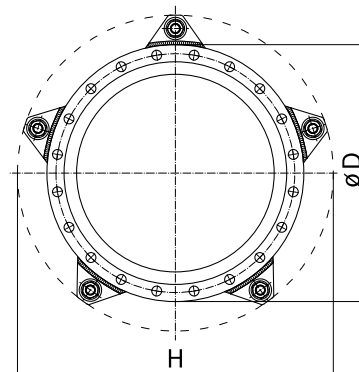
Tie rods, external restraints, carried on silencing rubber sockets

## MOVEMENT COMPENSATION / FLANGE VERSIONS

| DN   | BL  | Δ lat Lateral movement ± mm | Permissible vacuum w/o supporting ring at length BL bar absolute | Weight type A-2 approx. kg |
|------|-----|-----------------------------|--|----------------------------|
| 20   | 100 | 10                          | -  | 3.9                        |
| 25   | 100 | 10                          | -  | 3.9                        |
| 32   | 125 | 15                          | 0.6  | 5.1                        |
| 32   | 150 | 20                          | 0.5  | 5.2                        |
| 40   | 125 | 15                          | 0.6  | 5.6                        |
| 40   | 150 | 20                          | 0.5  | 5.7                        |
| 50   | 125 | 15                          | 0.6  | 6.3                        |
| 50   | 150 | 20                          | 0.5  | 6.4                        |
| 65   | 125 | 15                          | 0.6  | 8.0                        |
| 65   | 150 | 20                          | 0.7  | 8.1                        |
| 80   | 150 | 15                          | 0.65   | 10.7                       |
| 100  | 150 | 15                          | 0.65   | 12.6                       |
| 125  | 150 | 15                          | 0.7  | 16.8                       |
| 150  | 150 | 15                          | 0.75   | 19.6                       |
| 175  | 150 | 15                          | 0.8  | 19.9                       |
| 200  | 150 | 15                          | 0.9  | 22.5                       |
| 200  | 175 | 15                          | 0.9  | 22.7                       |
| 250  | 175 | 15                          | 0.9  | 27.5                       |
| 250  | 200 | 15                          | 0.9  | 27.6                       |
| 300  | 200 | 15                          | 0.9  | 31.6                       |
| 350  | 200 | 15                          | 0.95   | 46.7                       |
| 400  | 200 | 15                          | 0.95   | 57.8                       |
| 450  | 250 | 30                          | 0.35   | 85.7                       |
| 500  | 250 | 30                          | 0.35   | 98.0                       |
| 600  | 250 | 30                          | 0.35   | 133.9                      |
| 700  | 275 | 30                          | 0.5  | 173.5                      |
| 800  | 275 | 30                          | 0.5  | 213.6                      |
| 900  | 300 | 30                          | 0.6  | 250.0                      |
| 1000 | 300 | 30                          | 0.6  | 295.5                      |

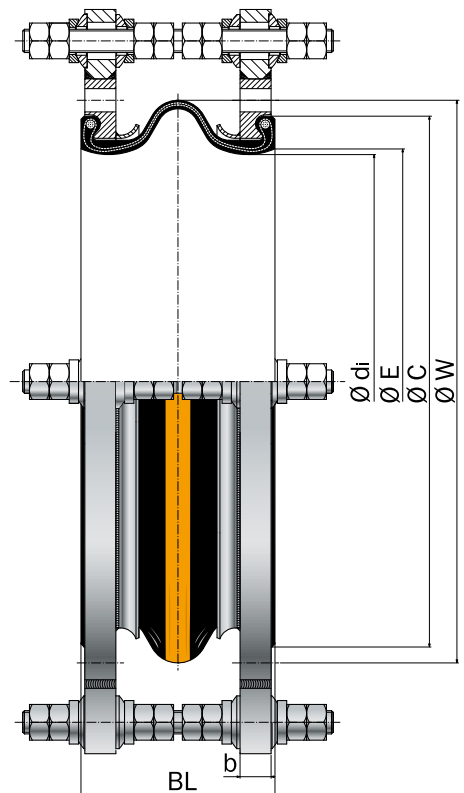


DN 20 - DN 150



DN 175 - DN 1000

Number of tie rods depending on pressure



**Type A-4**

Design as type A-2, additional internal restraints, carried on spherical washers and conical seats