TYPE
81
PTFE

# TYPE 81 PTFE
## EXPANSION JOINT



**DN 20 to DN 500**
Type 81 is a 2 to 7 corrugated PTFE Expansion Joint that is hot-formed from an extruded PTFE tube under pressure. It is characterised by its large movement absorption (depending on the number of corrugations), high media resistance and good non-stick properties.

Type 81 is mainly used in chemical plants, where it compensates for movements and assembly inaccuracies and dampens noise.

Due to its high elasticity and very low adjustment forces, it can also be used in pipework made of fragile materials such as glass, graphite or enamel.

**Bellow design**
Multi-corrugated, PTFE Bellow with external stainless steel supporting rings from 1.4571.

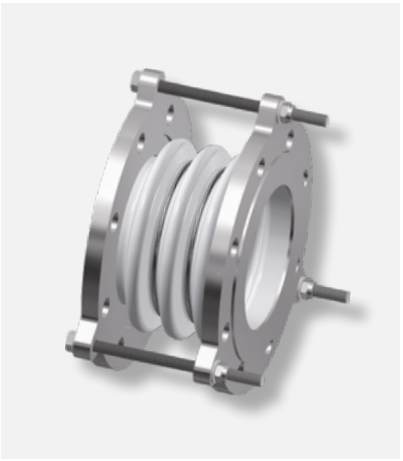
PTFE bead on both sides for steel flanges with integrated tie rods. Standard version: white PTFE, electrically insulating. Special version: black PTFE, electrically conductive.

**Flange version**
With bracing flange on both sides made of primed, galvanised steel, drilled to DIN PN 16 from DN 200 DIN PN 10 (standard). Other materials and dimensions are possible.

**Conformity**
FDA and EG 1935/2004 conform.

**Pressure resistance**
Max. 13 bar working pressure (highly dependent on nominal diameter, number of corrugations and temperature ➡ see tables).

**Vacuum resistance**
With vacuum supporting rings, vacuum-proof.

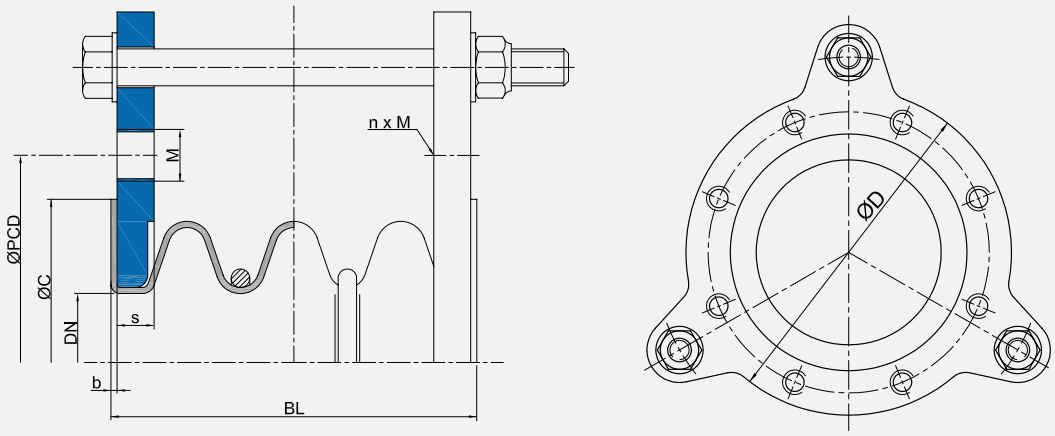


**Special accessories**
- PTFE guide sleeves
- Flame-resistant protective covers
- Dust and splash protection covers
- Earth cover / sun protection cover

Further information is available on request.

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# STANDARD VERSION
# 3-CORRUGATED - WITH TIE RODS




From to DN 200, a threaded rod is used as a tie rod instead of a hexagon bolt.

**Important information**

No additional seals are required for normal, flat flange connections up to DN 300. From DN 350 and in the case of glass components or other connecting parts it is necessary to use elastic seals made of TFM with reinforcement (please refer to the required surface pressure). PTFE Expansion Joints may not be subject to torsion or vibration. The Bellows should not be painted. Please refer to the planning instructions, which is avialable on request.

Belman

TYPE 81 PTFE

# DIMENSIONS

| DN | Di | OVERALL LENGTH BL | | | | | | BELLOW | | | FLANGE PN 10*2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Bellow) mm | 2-corrugated | 3-corrugated | 4-corrugated | 5-corrugated | 6-corrugated | 7-corrugated | b mm | ØC mm | WF*1 mm² | ØD mm | ØLK mm | Ød mm | n | s mm |
| **20** | **20** | 40 | 45 | 55 | 70 | - | 100 | 2.4 | 68 | 740 | 105 | 75 | M12 | 4 | 8 |
| **25** | **25** | 40 | 45 | 55 | 70 | - | 100 | 2.4 | 68 | 740 | 115 | 85 | M12 | 4 | 10 |
| ***3 32** | **31** | 40 | 50 | 65 | - | - | 105 | 2.4 | 78 | 1280 | 140 | 100 | M16 | 4 | 10 |
| **40** | **38** | 45 | 50 | 65 | 75 | - | 105 | 2.4 | 88 | 1800 | 150 | 110 | M16 | 4 | 10 |
| **50** | **47** | 45 | 70 | 80 | 100 | 150 | - | 2.8 | 102 | 2820 | 165 | 125 | M16 | 4 | 12 |
| **65** | **61** | 55 | 80 | 90 | 110 | - | 150 | 2.8 | 122 | 4530 | 185 | 145 | 18/M16 | 8 | 12 |
| **80** | **77** | 60 | 95 | 115 | 140 | 175 | - | 2.8 | 138 | 7020 | 200 | 160 | 18/M16 | 8 | 12 |
| **100** | **95** | 70 | 95 | 115 | 140 | 175 | - | 3.2 | 158 | 10020 | 220 | 180 | 18/M16 | 8 | 14 |
| **125** | **117** | 80 | 100 | 140 | 175 | - | - | 3.2 | 188 | 14290 | 250 | 210 | 18/M16 | 8 | 14 |
| **150** | **142** | 90 | 120 | - | - | - | - | 3.6 | 212 | 19670 | 285 | 240 | 22 | 8 | 16 |
| **200** | **188** | 95 | 130 | 150 | 175 | - | 200 | 3.6 | 268 | 35450 | 340 | 295 | 22 | 8 | 16 |
| **250** | **238** | 100 | 130 | - | - | - | - | 4.0 | 320 | 54040 | 395 | 350 | 22 | 12 | 18 |
| **300** | **285** | 110 | 145 | - | - | - | - | 4.0 | 370 | 82100 | 445 | 400 | 22 | 12 | 18 |
| **350** | **324** | 110 | 150 | - | - | - | - | 4.0 | 430 | 96320 | 505 | 460 | 22 | 16 | 18 |
| **400** | **374** | 115 | 155 | 180 | 225 | - | 320 | 4.8 | 482 | 130620 | 565 | 515 | 26 | 16 | 20 |
| **500** | **448** | 120 | 160 | - | - | - | - | 4.4 | 585 | 198850 | 670 | 620 | 26 | 20 | 30 |

*1: WF = effective area

*2: In the 2-corrugated version, the nominal sizes DN 65 to DN 125 have a flange with through holes on one side and threaded holes on the other side. From DN 150, the flanges are equipped with through-holes. Other dimensions such as DIN PN 6, PN 16, ANSI B16.5 - 150 lbs are possible.

*3: With Bellow DN 40

TYPE 81 PTFE

# MOVEMENT ABSORPTION

| DN | 2-CORROGATED | | | 3-CORROGATED | | | 4-CORROGATED | | | 5-CORROGATED | | | 6-CORROGATED | | | 7-CORROGATED | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AX +/- mm | LA +/- mm | AN +/- ∠° | AX +/- mm | LA +/- mm | AN +/- ∠° | AX +/- mm | LA +/- mm | AN +/- ∠° | AX +/- mm | LA +/- mm | AN +/- ∠° | AX +/- mm | LA +/- mm | AN +/- ∠° | AX +/- mm | LA +/- mm | AN +/- ∠° |
| **20** | 6.5 | 4 | 4 | 12.5 | 10 | 18 | 15 | 10 | 18 | 15 | 12 | 18 | - | - | - | 20 | 20 | 20 |
| **25** | 6.5 | 4 | 4 | 12.5 | 10 | 18 | 15 | 10 | 18 | 15 | 12 | 18 | - | - | - | 20 | 20 | 20 |
| ***32** | 6.5 | 4 | 4 | 12.5 | 10 | 20 | 15 | 15 | 20 | - | - | - | - | - | - | 20 | 25 | 25 |
| **40** | 6.5 | 5 | 8 | 12.5 | 15 | 20 | 15 | 15 | 20 | 15 | 17 | 20 | - | - | - | 20 | 25 | 25 |
| **50** | 6.5 | 6 | 8 | 19.0 | 20 | 25 | 20 | 20 | 25 | 20 | 20 | 25 | 25 | 25 | 30 | - | - | - |
| **65** | 7.5 | 9 | 10 | 21.0 | 20 | 30 | 22 | 20 | 30 | 22 | 25 | 30 | - | - | - | 25 | 25 | 30 |
| **80** | 10.0 | 10 | 10 | 25.0 | 25 | 30 | 25 | 25 | 30 | 27 | 25 | 30 | 30 | 30 | 30 | - | - | - |
| **100** | 10.0 | 12 | 20 | 25.0 | 25 | 30 | 25 | 25 | 30 | 27 | 27 | 30 | 30 | 35 | 35 | - | - | - |
| **125** | 15.0 | 14 | 15 | 28.5 | 25 | 30 | 28 | 25 | 30 | 27 | 27 | 30 | - | - | - | - | - | - |
| **150** | 15.0 | 10 | 10 | 28.5 | 20 | 30 | - | - | - | - | - | - | - | - | - | - | - | - |
| **200** | 15.0 | 10 | 10 | 28.5 | 20 | 20 | 30 | 20 | 20 | 35 | 20 | 20 | - | - | - | 40 | 35 | 35 |
| **250** | 18.0 | 10 | 10 | 28.5 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - | - |
| **300** | 18.0 | 8 | 8 | 30.0 | 8 | 10 | - | - | - | - | - | - | - | - | - | - | - | - |
| **350** | 20.0 | 5 | 6 | 30.0 | 5 | 10 | - | - | - | - | - | - | - | - | - | - | - | - |
| **400** | 20.0 | 5 | 6 | 30.0 | 5 | 10 | 30 | 8 | 10 | 40 | 7 | 13 | - | - | - | 40 | 35 | 35 |
| **500** | 20.0 | 5 | 6 | 30.0 | 5 | 10 | - | - | - | - | - | - | - | - | - | - | - | - |

The movement absorption values are maximum values and must not occur in combination. Please refer to the movement diagram (which is available on request).

*With Bellow DN 40

# PERMISSIBLE PRESSURE LOAD UNDER TEMPERATURE

| TEMP. / DN | PRESSURE (bar) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2-CORROGATED | | | 3-CORROGATED | | | 4-CORROGATED | | | 5-CORROGATED | | | 6-CORROGATED | | | 7-CORROGATED | | |
| | 20°C | 100°C | 200°C | 20°C | 100°C | 200°C | 20°C | 100°C | 200°C | 20°C | 100°C | 200°C | 20°C | 100°C | 200°C | 20°C | 100°C | 200°C |
| **20-50** | 13.0 | 9.0 | 5.0 | 8.6 | 5.5 | 3.2 | 7.6 | 5.1 | 3.2 | 6.8 | 4.8 | 3.2 | 5.9 | 3.6 | 2.0 | 5.9 | 3.6 | 2.0 |
| **65-150** | 11.0 | 7.5 | 3.8 | 7.7 | 4.7 | 2.7 | 6.7 | 4.3 | 2.6 | 5.8 | 3.9 | 2.5 | 5.3 | 3.1 | 1.6 | 5.3 | 3.1 | 1.6 |
| **200-400** | 5.2 | 4.5 | 3.0 | 6.8 | 4.1 | 2.3 | 5.8 | 3.5 | 2.0 | 4.8 | 3.0 | 1.8 | 4.7 | 2.7 | 1.4 | 4.7 | 2.7 | 1.4 |
| **450-500** | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |

TYPE 81 PTFE

# STIFFNESS RATES
## (2 TO 4 CORRUGATIONS)

| DN | 2-CORROGATED | | | | 3-CORROGATED | | | | 4-CORROGATED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AX Compression N/mm | AX Elongation N/mm | LA N/mm | AN Nm/° | AX Compression N/mm | AX Elongation N/mm | LA N/mm | AN Nm/° | AX Compression N/mm | AX Elongation N/mm | LA N/mm | AN Nm/° |
| **20** | 36.0 | 30.0 | 112.5 | 2.3 | 24.0 | 20.0 | 75.0 | 1.5 | 18.00 | 15.00 | 56.25 | 1.13 |
| **25** | 36.0 | 30.0 | 112.5 | 2.3 | 24.0 | 20.0 | 75.0 | 1.5 | 18.00 | 15.00 | 56.25 | 1.13 |
| ***32** | 67.5 | 55.5 | 162.0 | 3.3 | 45.0 | 37.0 | 108.0 | 2.2 | 33.75 | 27.75 | 81.00 | 1.65 |
| **40** | 94.5 | 75.0 | 213.0 | 4.4 | 63.0 | 50.0 | 142.0 | 2.9 | 47.25 | 37.50 | 106.50 | 2.18 |
| **50** | 157.5 | 112.5 | 247.5 | 5.0 | 105.0 | 75.0 | 165.0 | 3.3 | 78.75 | 56.25 | 123.75 | 2.48 |
| **65** | 184.5 | 123.0 | 294.0 | 5.7 | 123.0 | 82.0 | 196.0 | 3.8 | 92.25 | 61.50 | 147.00 | 2.85 |
| **80** | 229.5 | 147.0 | 346.5 | 7.1 | 153.0 | 98.0 | 231.0 | 4.7 | 114.75 | 73.50 | 173.25 | 3.53 |
| **100** | 259.5 | 153.0 | 390.0 | 8.1 | 173.0 | 102.0 | 260.0 | 5.4 | 129.75 | 76.50 | 195.00 | 4.05 |
| **125** | 292.5 | 153.0 | 502.5 | 10.7 | 195.0 | 102.0 | 335.0 | 7.1 | 146.25 | 76.50 | 251.25 | 5.33 |
| **150** | 327.0 | 159.0 | 577.5 | 15.9 | 218.0 | 106.0 | 385.0 | 10.6 | - | - | - | - |
| **200** | 276.0 | 138.0 | 630.0 | 16.8 | 184.0 | 92.0 | 420.0 | 11.2 | 138.00 | 69.00 | 315.00 | 8.40 |
| **250** | 283.5 | 136.5 | 762.0 | 23.7 | 189.0 | 91.0 | 508.0 | 15.8 | - | - | - | - |
| **300** | 267.0 | 144.0 | 915.0 | 34.7 | 178.0 | 96.0 | 610.0 | 23.1 | - | - | - | - |
| **350** | 352.5 | 180.0 | 1066.5 | 42.9 | 235.0 | 120.0 | 711.0 | 28.6 | - | - | - | - |
| **400** | 384.0 | 153.0 | 1219.5 | 53.6 | 256.0 | 102.0 | 813.0 | 35.7 | 192.00 | 76.50 | 609.75 | 26.78 |
| **500** | 570.0 | 363.0 | 1524.0 | 70.5 | 380.0 | 242.0 | 1016.0 | 47.0 | - | - | - | - |

The stiffness rates are valid for 20°C +/- 30%.
For higher temperatures, please note the correction factors below.

*With Bellow DN 40

# CORRECTION FACTOR
## FOR TEMPERATURES

| Temperature | 80°C | 120°C | 150°C |
|---|---|---|---|
| **Factor** | 0.65 | 0.50 | 0.40 |

**Important information**
Please note the appropriate fix point constructions and plain bearings in your piping system! For more information please refer to the installation instruction, which is avialable on request.

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# STIFFNESS RATES
## (5 TO 7 CORRUGATIONS)

| DN | 5-CORROGATED | | | | 6-CORROGATED | | | | 7-CORROGATED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AX Compression N/mm | AX Elongation N/mm | LA N/mm | AN Nm/° | AX Compression N/mm | AX Elongation N/mm | LA N/mm | AN Nm/° | AX Compression N/mm | AX Elongation N/mm | LA N/mm | AN Nm/° |
| **20** | 14.4 | 12.0 | 45.0 | 0.9 | - | - | - | - | 10.3 | 8.6 | 32.3 | 0.6 |
| **25** | 14.4 | 12.0 | 45.0 | 0.9 | - | - | - | - | 10.3 | 8.6 | 32.3 | 0.6 |
| ***32** | - | - | - | - | - | - | - | - | 19.4 | 15.9 | 46.4 | 0.9 |
| **40** | 37.8 | 30.0 | 85.2 | 1.7 | - | - | - | - | 27.1 | 21.5 | 61.1 | 1.2 |
| **50** | 63.0 | 45.0 | 99.0 | 2.0 | 52.5 | 37.5 | 82.5 | 1.65 | - | - | - | - |
| **65** | 73.8 | 49.2 | 117.6 | 2.3 | - | - | - | - | 52.9 | 35.3 | 84.3 | 1.6 |
| **80** | 91.8 | 58.8 | 138.6 | 2.8 | 76.5 | 49 | 115.5 | 2.35 | - | - | - | - |
| **100** | 103.8 | 61.2 | 156.0 | 3.2 | 86.5 | 51 | 130 | 2.7 | - | - | - | - |
| **125** | 117.0 | 61.2 | 201.0 | 4.3 | - | - | - | - | - | - | - | - |
| **150** | - | - | - | - | - | - | - | - | - | - | - | - |
| **200** | 110.4 | 55.2 | 252.0 | 6.7 | - | - | - | - | 79.1 | 39.6 | 180.6 | 4.8 |
| **250** | - | - | - | - | - | - | - | - | - | - | - | - |
| **300** | - | - | - | - | - | - | - | - | - | - | - | - |
| **350** | - | - | - | - | - | - | - | - | - | - | - | - |
| **400** | 153.6 | 61.2 | 487.8 | 21.4 | - | - | - | - | 110.1 | 43.9 | 349.6 | 15.4 |
| **500** | - | - | - | - | - | - | - | - | - | - | - | - |

The stiffness rates are valid for 20°C +/- 30%.
For higher temperatures, please note the correction factors below.

*With Bellow DN 40

# CORRECTION FACTOR
## FOR TEMPERATURES

| Temperature | 80°C | 120°C | 150°C |
|---|---|---|---|
| **Factor** | 0.65 | 0.50 | 0.40 |

**Important information**
Please note the appropriate fix point constructions and plain bearings in your piping system! For more information please refer to the installation instruction, which is avialable on request.