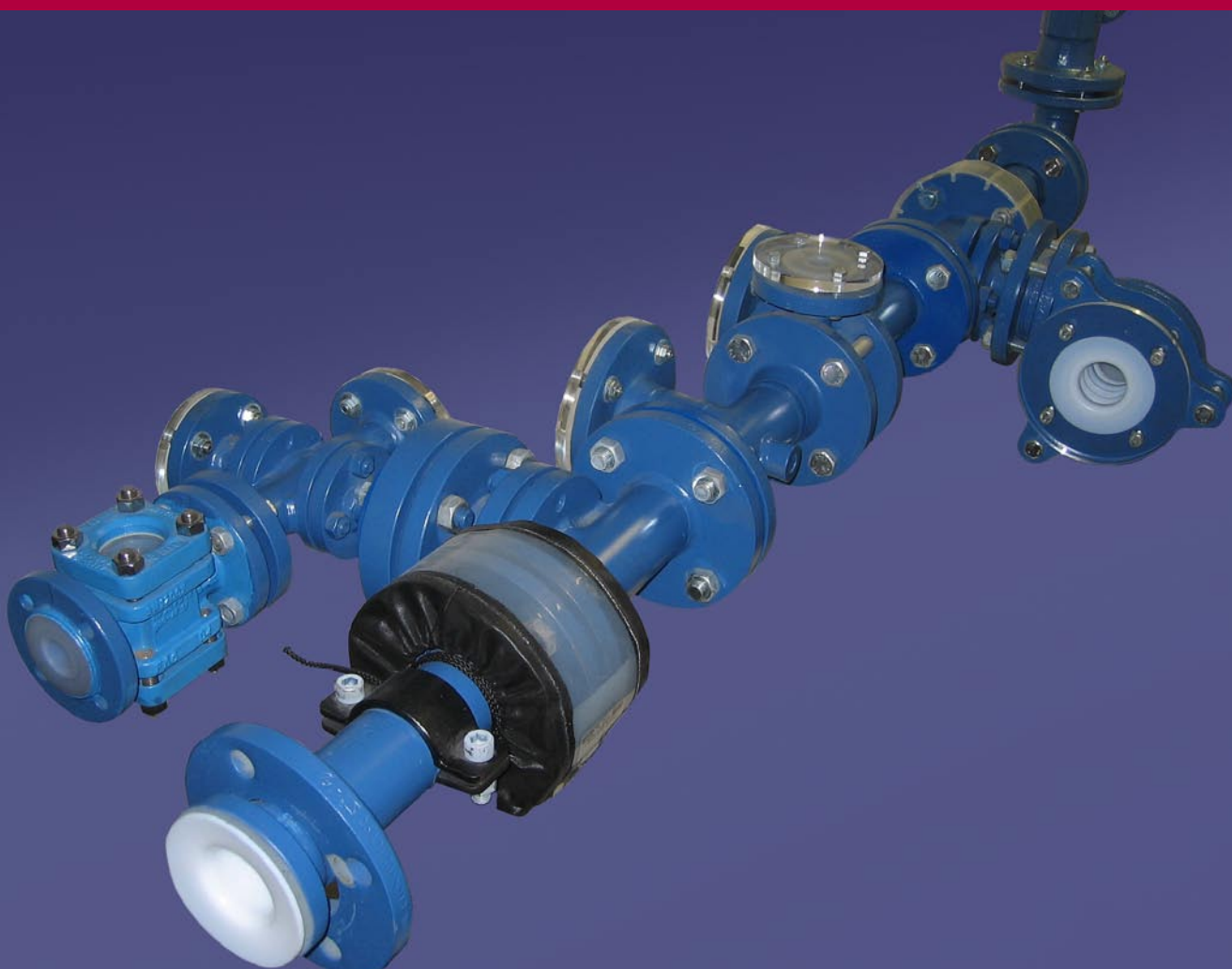


Dr. Schnabel  **FLUROPIPE®**

POLYFLURON®-PTFE lined
Steel Pipes and Fittings ASME

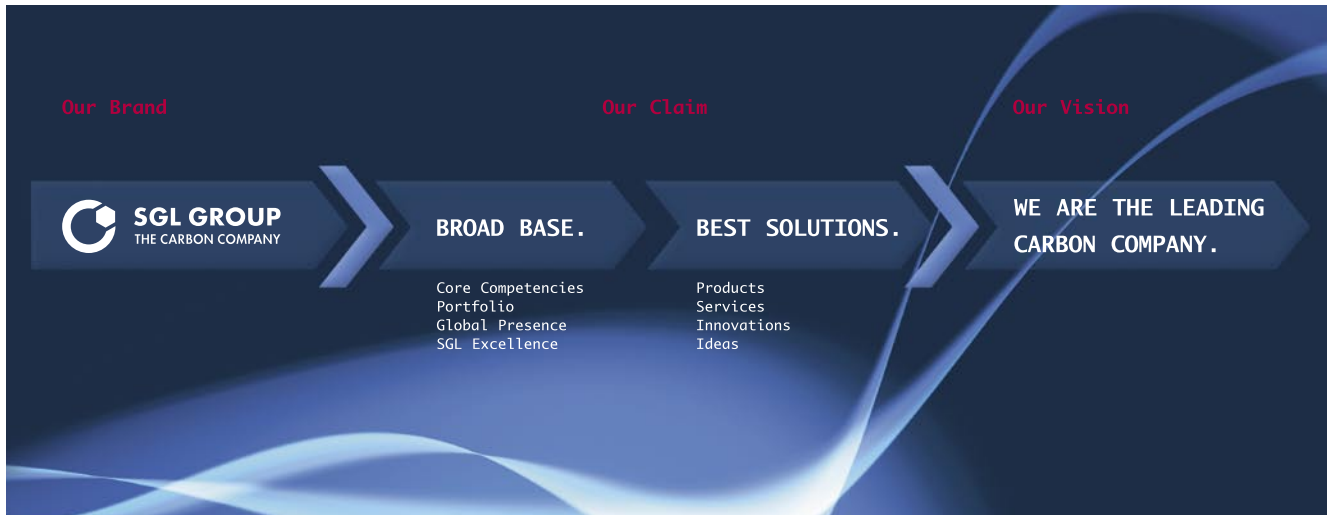
Process Technology



Broad Base. Best Solutions.

 **SGL GROUP**
THE CARBON COMPANY

SGL Group – The Carbon Company



SGL Group – The Carbon Company – is one of the world’s leading manufacturers of carbon-based products. Our comprehensive portfolio ranges from carbon and graphite products to carbon fibers and composites.

Our core competencies include a wide knowledge of raw materials, specialized production expertise and in-depth application and engineering know-how. As a result, we have built up a comprehensive technology and product portfolio. We operate on a global scale and are close to our customers anywhere at any time. Supported by this broad base, we offer our customers the best solutions. That is what SGL Excellence stands for.

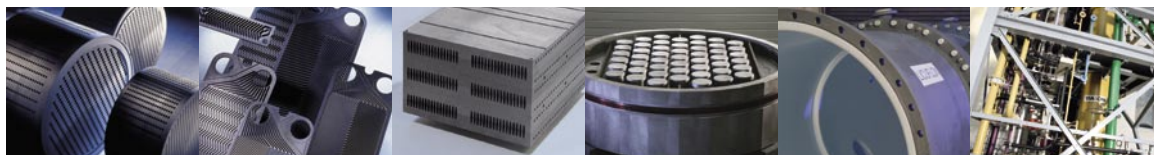
Process Technology

Perfection in Graphite and PTFE

Our Business Line Process Technology is focused on supporting the technical processes of our globally operating customers in the chemical industry, metal manufacturing and environmental protection technology. A maximum degree of know-how and expertise in corrosion protection, a global presence and full-package systems from a single source: that's what our customers need – and get from us:

- ▶ Long-standing experience and a high level of expertise in process technology
- ▶ Comprehensive process, material and design know-how on graphite and PTFE
- ▶ Closeness to customers: cost-effective manufacturing to international and local standards at our production sites in Europe, America and Asia and worldwide customer service
- ▶ A consistently high standard of quality

Our comprehensive range of products and services extends from process equipment and components made from DIABON® graphite and POLYFLURON® virginal, paste-extruded PTFE, through LICUFLON® skived PTFE sheet-lined steel equipment, FLUROFLEX® bellows, FLUROPIPE® pipe systems, FLUROSIC® silicon carbide heat exchangers and DIABON® graphite or exotic metal pumps, to the planning and assembly of complex systems.



Contents

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Dr. Schnabel - PTFE in the Process Industry

Many years ago Dr. Schnabel became the first company in Europe to manufacture paste extruded PTFE lined steel pipe systems. Our POLYFLURON® products have proved reliable in long term operation in many countries of the world. The following pages provide information on available products, dimensions and design options, as well as the materials used and permitted operating conditions.

This brochure deals exclusively with pipes & fittings up to a diameter of 24" (DN 600). Larger dimensions up to 120" (DN 3000) for columns and vessels are covered by a separate brochure, which is available on request.

POLYFLURON® PTFE

POLYFLURON® PTFE is a virginial paste extruded PTFE processed in-house. Components made from it are characterized by very low permeation rates, substantial wall thicknesses and long service lives.

3-D bent pipes

Single-component, multi-bent pipes are available in diameters of 1" up to 4" and overall lengths of up to 6 m. Please ask us for more information.

Full service

Besides supplying lined components for pipe systems, we are also able to prepare isometric drawings and material take-offs and plan the replacement of existing pipework. This full service from a single source will save you time and money.

Safety

We increase the safety of the plant, operators and fitters by using:

- ▶ Top-quality linings
- ▶ Lugs on each pipe and thereby prevent an uncontrolled movement of loose flanges over the pipe length during assembly
- ▶ Safety shields and tapes

Pressure equipment directive

Many pipes and fittings need to be tested differently based on the European Pressure Equipment Directive. We offer you our components and complete systems that match the requirements of this directive.



Our Range of Pipe Systems

More than 50 years experience has allowed us to develop a full range of POLYFLURON® PTFE lined pipe systems. These systems offer the best cost/benefit ratio for our customers' particular applications because of the different PTFE lining thicknesses used:

Economy

Corrosion resistant, thin walled lining for minor applications. This kind of lining is used at fairly low temperatures with low-permeation media.

Standard

Corrosion resistant and permeation reducing lining for aggressive media processed at moderate pressures and temperatures. This product series meets the standards of the chemical industry for paste extruded PTFE linings.

Heavy duty

Suitable for long term operation with highly permeable media processed at high pressures and temperatures.

Dr. Schnabel's range of pipe & fittings

From our many years experience, we recommend the use of standardized pipe lengths. These reduce inventory costs and allow greater flexibility in assembly.

Our product range includes pipes of the following dimensions:

| | |
|--------------------|--|
| Nominal diameters: | from 1" to 24" |
| Lengths: | from 100 mm up to 6100 mm (20 ft.), depending on the nominal diameter |

Technical Specifications

Materials

The standards given below are ASME standards. If you require pipes and fittings according to ASME standards, please refer to our respective EN/ DIN brochure.

| Pipes/Fittings: |
|-----------------|
| Material code |
| A 106 Gr. B |
| API 5L Gr. B |
| A 234 WPB |

| Flanges: |
|-------------------------|
| Material code |
| A 105 (C21) |
| S235JRG2 (A 570 Gr. 36) |
| P265 GH (A 515 Gr. 55) |

Subject to technical changes

Stainless steel materials are available on request.

Lining: POLYFLURON® PTFE white (virginal paste-extruded PTFE) meeting DIN 2874.

POLYFLURON® PTFE black (virginal paste-extruded PTFE with graphite content) antistatic, conductive lining meeting DIN 2874.

Field of use

Temperatures: -10° up to +200°C
(-263 K up to 473 K)

Pressure load: 10 bar (10⁶ Pa) (150 lbs)
Please ask us for information on higher pressure ratings (e.g. 300 lbs).

Vacuum: Full vacuum (-1 barg) for all dimensions up to 4" and 150 °C. Vacuum-resistant versions for larger dimensions and higher temperatures on request.

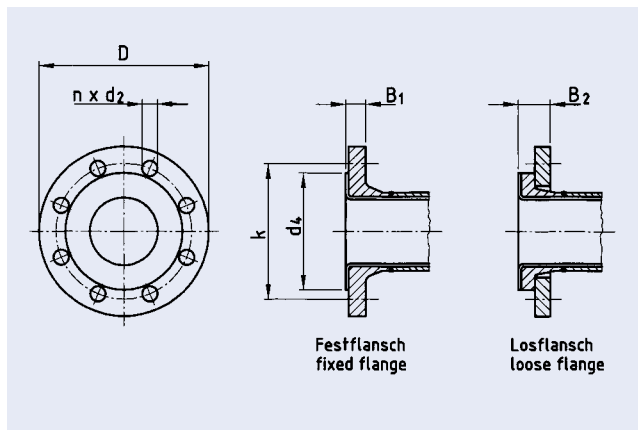
Options

- ▶ Antistatic (conductive) lining for all components
- ▶ Vent hole extensions
- ▶ Stainless steel with PTFE lining
- ▶ 3-D bent pipes
- ▶ Flared steel pipes
- ▶ Insulation clips
- ▶ Earthing lugs

Technical Specifications

Pipe dimensions

The following table gives the standard wall thicknesses of steel pipes meeting ANSI B36.10.



| DN | Steel pipe Outside diam. x wall thickness | DN | Steel pipe Outside diam. x wall thickness |
|--------|---|-----|---|
| mm | mm | mm | mm |
| 1" | 33.4 x 3.4 | 8" | 219.1 x 8.2 |
| 1 1/4" | 42.2 x 3.6 | 10" | 273 x 9.3 |
| 1 1/2" | 48.3 x 3.7 | 12" | 323.9 x 9.5 |
| 2" | 60.3 x 3.9 | 14" | 355.6 x 9.5 |
| 2 1/2" | 73 x 5.5 | 16" | 406.4 x 9.5 |
| 3" | 88.9 x 5.5 | 18" | 457.2 x 9.5 |
| 4" | 114.3 x 6 | 20" | 508 x 9.5 |
| 5" | 141.3 x 6.6 | 24" | 610 x 9.5 |
| 6" | 168.3 x 7.1 | | |

Subject to technical changes

Flange dimensions

Flange details are given in the table below.

| DN | Flange diam. D | Seal. surf. d4 | Bolt circle diam. k | nx Bolt holes | d2 | B1 Flange thickness incl. collar | B2 |
|--------|-------------------|-------------------|---------------------------|------------------|------|--|----|
| mm | mm | mm | mm | Number | mm | mm | mm |
| 1" | 107.9 | 51 | 79.4 | 4 | 15.9 | 17 | 29 |
| 1 1/4" | 117.5 | 64 | 88.9 | 4 | 15.9 | 19 | 31 |
| 1 1/2" | 127 | 73 | 98.4 | 4 | 15.9 | 21 | 33 |
| 2" | 152.4 | 92 | 120.6 | 4 | 19 | 22 | 36 |
| 2 1/2" | 177.8 | 105 | 139.7 | 4 | 19 | 26 | 40 |
| 3" | 190.5 | 127 | 152.4 | 4 | 19 | 27 | 43 |
| 4" | 228.6 | 157 | 190.5 | 8 | 19 | 28 | 44 |
| 5" | 254 | 186 | 215.9 | 8 | 22.2 | 28 | 46 |
| 6" | 279.4 | 216 | 241.3 | 8 | 22.2 | 30 | 48 |
| 8" | 342.9 | 270 | 298.4 | 8 | 22.2 | 34 | 54 |
| 10" | 406.4 | 324 | 361.9 | 12 | 25.4 | 35 | 57 |
| 12" | 482.6 | 381 | 431.8 | 12 | 25.4 | 37 | 59 |
| 14" | 533.4 | 413 | 476.2 | 12 | 28.6 | 40 | 62 |
| 16" | 596.9 | 470 | 539.7 | 16 | 28.6 | 42 | 66 |
| 18" | 635 | 533 | 577.8 | 16 | 31.7 | 45 | 69 |
| 20" | 698.5 | 584 | 635 | 20 | 31.7 | 48 | 74 |
| 24" | 812.8 | 692 | 749.3 | 20 | 34.9 | 53 | 79 |

Subject to technical changes

PTFE Lined Pipes

The standardized diameters and lengths of POLYFLURON® PTFE lined steel pipes are given in ASME B 16.5 standard. We can supply all items listed in this standard. For larger diameters up to 120" (DN 3000), please refer to our separate brochure entitled "Columns and Vessels".

| DN | L min | L max | Lining wall thickness | | | PTFE Flange diam. d4 | Weight fix/loose | | Order no. |
|-----|-------|-------|-----------------------|----------|------------|-------------------------------|------------------|--------|--------------|
| | | | Economy | Standard | Heavy Duty | | Lined | Flange | |
| | | | S | S | S | | pipe | | |
| mm | mm | mm | mm | mm | mm | mm | kg/m | kg | |
| 1" | 100 | 6000 | 2 | | | 51 | | | 1RO0025119 * |
| 1" | 100 | 6000 | | 3 | | 51 | 3 | 2.1 | 1RO0025125 * |
| 1" | 100 | 6000 | | | 4 | 51 | | | 1RO0025131 * |
| 1¼" | 100 | 6000 | 2 | | | 64 | | | 1RO0032119 * |
| 1¼" | 100 | 6000 | | 3 | | 64 | 4 | 2.8 | 1RO0032125 * |
| 1¼" | 100 | 6000 | | | 4 | 64 | | | 1RO0032131 * |
| 1½" | 100 | 6000 | 2 | | | 73 | | | 1RO0040119 * |
| 1½" | 100 | 6000 | | 3 | | 73 | 4.9 | 3.3 | 1RO0040125 * |
| 1½" | 100 | 6000 | | | 4 | 73 | | | 1RO0040131 * |
| 2" | 100 | 6000 | 2 | | | 92 | | | 1RO0050119 * |
| 2" | 100 | 6000 | | 3 | | 92 | 6.5 | 5.3 | 1RO0050125 * |
| 2" | 100 | 6000 | | | 4 | 92 | | | 1RO0050131 * |
| 2½" | 100 | 6000 | 2.5 | | | 105 | | | 1RO0065119 * |
| 2½" | 100 | 6000 | | 3.5 | | 105 | 10 | 7.8 | 1RO0065125 * |
| 2½" | 100 | 6000 | | | 4 | 105 | | | 1RO0065131 * |
| 3" | 110 | 6000 | 2.5 | | | 127 | | | 1RO0080119 * |
| 3" | 110 | 6000 | | 3.5 | | 127 | 13 | 9.3 | 1RO0080125 * |
| 3" | 110 | 6000 | | | 4 | 127 | | | 1RO0080131 * |
| 4" | 110 | 6000 | 3 | | | 157 | | | 1RO0100119 * |
| 4" | 110 | 6000 | | 4.5 | | 157 | 19 | 14 | 1RO0100125 * |
| 4" | 110 | 6000 | | | 5 | 157 | | | 1RO0100131 * |
| 5" | 110 | 6000 | 3.5 | | | 186 | | | 1RO0125119 * |
| 5" | 110 | 6000 | | 4.5 | | 186 | 25 | 17 | 1RO0125125 * |
| 5" | 110 | 6000 | | | 5 | 186 | | | 1RO0125131 * |
| 6" | 120 | 6000 | 4.5 | | | 216 | | | 1RO0150119 * |
| 6" | 120 | 6000 | | 5 | | 216 | 33 | 21 | 1RO0150125 * |
| 6" | 120 | 6000 | | | 6 | 216 | | | 1RO0150131 * |
| 8" | 130 | 6000 | 4.5 | | | 270 | | | 1RO0200119 * |
| 8" | 130 | 6000 | | 5 | | 270 | 49 | 34 | 1RO0200125 * |
| 8" | 130 | 6000 | | | 8 | 270 | | | 1RO0200131 * |
| 10" | 130 | 6000 | | 5 | | 324 | 68 | 47 | 1RO0250113 * |
| 10" | 130 | 6000 | | | 8 | 324 | | | 1RO0250119 * |

* Please indicate length with order

Subject to technical changes

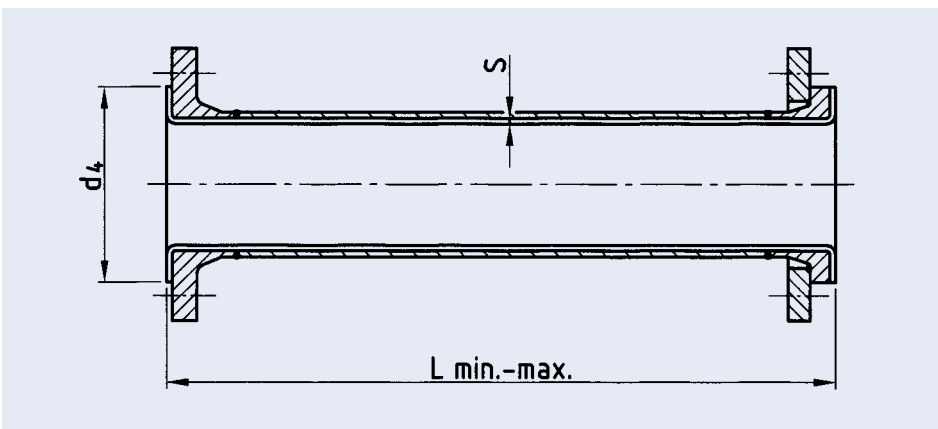
PTFE Lined Pipes

The standardized diameters and lengths of POLYFLURON® PTFE lined steel pipes are given in ASME B 16.5 standard. We can supply all items listed in this standard. For larger diameters up to 120" (DN 3000), please refer to our separate brochure entitled „Columns and Vessels“.

| DN | L min | L max | Lining wall thickness | | | PTFE Flange diam. d4 | Weight | | Order no. PTFE |
|-----|-------|-------|-----------------------|----------|------------|-------------------------------|--------|--------|-------------------|
| | | | Economy | Standard | Heavy Duty | | Lined | Flange | |
| | | | S | S | S | | pipe | | |
| mm | mm | mm | mm | mm | mm | mm | kg/m | kg | |
| 12" | 150 | 4000 | | 5.5 | | 381 | 86 | 71 | 1RO0300113 |
| 12" | 150 | 4000 | | | 8 | 381 | | | 1RO0300119 |
| 14" | 150 | 3500 | | 5.5 | | 413 | 94 | 92 | 1RO0300113 |
| 14" | 150 | 2500 | | | 8 | 413 | | | 1RO0300119 |
| 16" | 200 | 2500 | | 5.5 | | 470 | 109 | 113 | 1RO0300113 |
| 16" | 200 | 2500 | | | 8 | 470 | | | 1RO0300119 |
| 18" | 200 | 2000 | | 5.5 | | 533 | 121 | 128 | 1RO0300113 |
| 18" | 200 | 2000 | | | 8 | 533 | | | 1RO0300119 |
| 20" | 250 | 2000 | | 6 | | 584 | 136 | 159 | 1RO0300113 |
| 20" | 250 | 2000 | | | 8 | 584 | | | 1RO0300119 |
| 24" | 250 | 1800 | | 6 | | 692 | 165 | 218 | 1RO0300113 |
| 24" | 250 | 1600 | | | 8 | 692 | | | 1RO0300119 |

* Please indicate length with order

Subject to technical changes



PTFE Lined Elbows

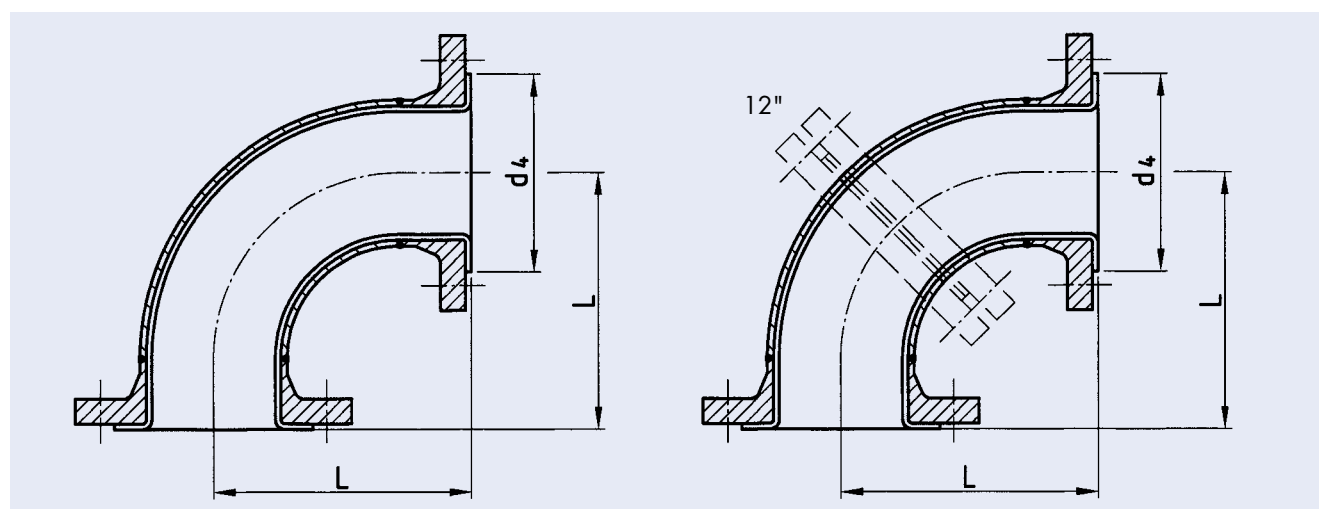
Elbows are manufactured with angles of 90°, 60°, 45° or 30°. Other angles are available on request. Please ask us for more information. 90° elbows are supplied with one fixed and one loose flange as standard. All 45° elbows come with fixed flanges. Alternatives are available on request.

Products up to 10" diam. are manufactured in one part. Items of 12" diam. or above come in two parts.

| DN | L | | PTFE S | PTFE d4 | Weight | | Order no. | |
|-----|--------------|-----|-----------|------------|--------------|-----|-------------|------------|
| | 90° Elbow | 45° | | | 90° Elbow | 45° | PTFE | |
| mm | mm | mm | mm | mm | approx. kg | | white 90° | white 45° |
| 1" | 89 | 51* | 3 | 51 | 2.5 | 2.4 | 1BG 0025106 | 1BG0025107 |
| 1¼" | 95 | 51 | 3 | 64 | 3.3 | 3 | 1BG 0032106 | 1BG0032107 |
| 1½" | 102 | 57 | 3 | 73 | 4.2 | 3.6 | 1BG 0040106 | 1BG0040107 |
| 2" | 114 | 64 | 3 | 92 | 6.4 | 5.4 | 1BG 0050106 | 1BG0050107 |
| 2½" | 127 | 76 | 3.5 | 105 | 8.8 | 7.9 | 1BG 0065106 | 1BG0065107 |
| 3" | 140 | 76 | 3.5 | 127 | 12 | 10 | 1BG 0080106 | 1BG0080107 |
| 4" | 165 | 102 | 4.5 | 157 | 17 | 15 | 1BG 0100106 | 1BG0100107 |
| 5" | 190 | 114 | 4.5 | 186 | 22 | 19 | 1BG 0125106 | 1BG0125107 |
| 6" | 203 | 127 | 5 | 216 | 31 | 22 | 1BG 0150106 | 1BG0150107 |
| 8" | 229 | 140 | 5 | 270 | 44 | 35 | 1BG 0200106 | 1BG0200107 |
| 10" | 279 | 165 | 5 | 324 | 65 | 61 | 1BG 0250106 | 1BG0250107 |
| 12" | 483 | 190 | 5.5 | 381 | 175 | 90 | 1BG 0300106 | 1BG0300107 |
| 14" | 546 | 190 | 5.5 | 413 | 239 | 99 | 1BG 0350106 | 1BG0350107 |
| 16" | 610 | 203 | 5.5 | 470 | 275 | 116 | 1BG 0400106 | 1BG0400107 |
| 20" | 737 | 241 | 6 | 584 | 448 | 167 | 1BG 0500106 | 1BG0500107 |
| 24" | 864 | 279 | 6 | 692 | 625 | 234 | 1BG 0600106 | 1BG0600107 |

* not included in ANSI B 16.5

Subject to technical changes



PTFE Lined Tees

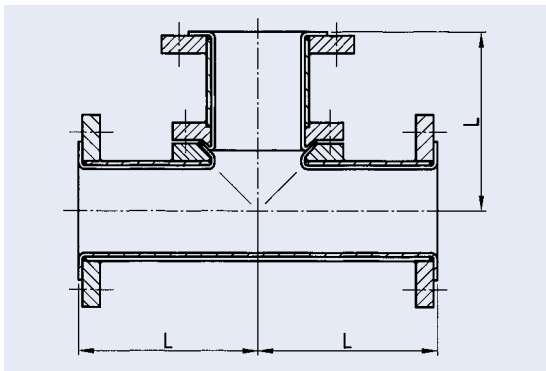
T-pieces up to 4" diam. are available with either of two different linings. The POLYFLURON® PTFE lined variant is supplied with a high performance flange connection of well-proven design (see drawing A).

As an alternative, PFA-lined tees are available as shown on drawing B. PFA is a tetrafluoroethylene-based copolymer with chemical and thermal properties comparable to those of PTFE. Fixed flanges are supplied as standard. Loose flanges are, however, also available on request.

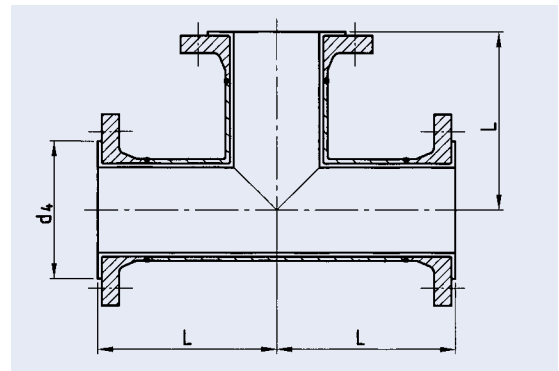
| DN | L | Weight | | Order no. | |
|-----|-----|------------|------------|------------|------------|
| | | PTFE | PFA | white PTFE | white PFA |
| mm | mm | approx. kg | approx. kg | | |
| 1" | 89 | | 5 | | 1TE0025106 |
| 1¼" | 95 | 7.5 | 6.5 | 1TE0032118 | 1TE0032106 |
| 1½" | 102 | 11 | 8.5 | 1TE0040119 | 1TE0040106 |
| 2" | 114 | 17 | 13 | 1TE0050117 | 1TE0050106 |
| 2½" | 127 | 18 | 17.5 | 1TE0065119 | 1TE0065106 |
| 3" | 140 | 26 | 28 | 1TE0080119 | 1TE0080106 |
| 4" | 165 | 40 | 47 | 1TE0100119 | 1TE0100106 |
| 5" | 190 | 45 | | 1TE0125103 | |
| 6" | 203 | 63 | | 1TE0150103 | |
| 8" | 229 | 107 | | 1TE0200103 | |
| 10" | 279 | 153 | | 1TE0250103 | |
| 12" | 305 | 215 | | 1TE0300103 | |
| 14" | 356 | 294 | | 1TE0350103 | |
| 16" | 381 | 360 | | 1TE0400103 | |
| 18" | 419 | 455 | | 1TE0450100 | |
| 20" | 457 | 570 | | 1TE0500103 | |

Subject to technical changes

Steel pipe dimensions, lining wall thicknesses and flange diameters correspond to the standard dimensions stated on Page 7.



PTFE lined T-pieces
Drawing A

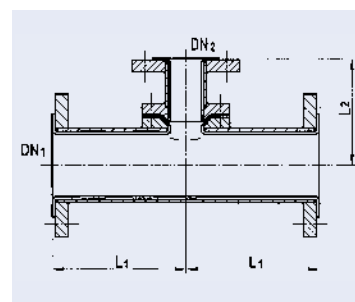


PFA lined T-pieces
Drawing B

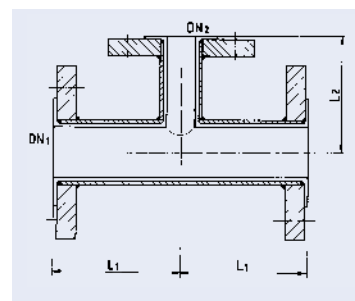
PTFE Lined Reducing Tees

All reducing tees are available with fixed flanges as standard. Loose flanges can also be supplied on request. PFA lined variants are also available up to 4" diam.. Intermediate sizes and special dimensions are supplied on request. Dimensions meet ANSI B 16.5.

| DN ₁ | DN ₂ | L ₁ | L ₂ | PTFE lining | | PFA lining | |
|-----------------|-----------------|----------------|----------------|-------------|------------|------------|------------|
| | | | | Weight | Order no. | Weight | Order no. |
| mm | mm | mm | mm | approx. kg | | approx. kg | |
| 1¼" | 1" | 95 | 95 | 5.3 | 1RT0032152 | 4.2 | 1RT0032112 |
| 1¼" | 1" | 102 | 102 | 6.1 | 1RT0040130 | 5.2 | 1RT0040112 |
| 2" | 1½" | 114 | 114 | 9.7 | 1RT0050154 | 8.7 | 1RT0050118 |
| 2" | 1" | 114 | 114 | 7.9 | 1RT0050155 | 8.4 | 1RT0050119 |
| 2½" | 2" | 127 | 127 | 15 | 1RT0065150 | 10.5 | 1RT0065118 |
| 2½" | 1½" | 127 | 127 | 14 | 1RT0065151 | 9.5 | 1RT0065119 |
| 3" | 2" | 140 | 140 | 18 | 1RT0080156 | 19 | 1RT0080118 |
| 3" | 1½" | 140 | 140 | 16 | 1RT0080157 | 18 | 1RT0080119 |
| 3" | 1" | 140 | 140 | 14 | 1RT0080158 | 17 | 1RT0080120 |
| 4" | 3" | 165 | 165 | 27 | 1RT0100156 | 34 | 1RT0100118 |
| 4" | 2" | 165 | 165 | 23 | 1RT0100157 | 31 | 1RT0100119 |
| 4" | 1" | 165 | 165 | 20 | 1RT0100158 | 29 | 1RT0100120 |
| 5" | 4" | 190 | 190 | 36 | 1RT0125112 | | |
| 5" | 3" | 190 | 190 | 32 | 1RT0125113 | | |
| 6" | 4" | 203 | 203 | 43 | 1RT0150112 | | |
| 6" | 3" | 203 | 203 | 39 | 1RT0150113 | | |
| 8" | 6" | 229 | 229 | 68 | 1RT0200108 | | |
| 8" | 4" | 229 | 229 | 61 | 1RT0200109 | | |
| 10" | 8" | 279 | 279 | 105 | 1RT0250112 | | |
| 10" | 6" | 279 | 279 | 94 | 1RT0250113 | | |
| 12" | 10" | 305 | 305 | 151 | 1RT0300118 | | |
| 12" | 8" | 305 | 305 | 137 | 1RT0300119 | | |
| 12" | 6" | 305 | 305 | 125 | 1RT0300120 | | |
| 14" | 12" | 356 | 356 | 201 | 1RT0350118 | | |
| 14" | 10" | 356 | 356 | 184 | 1RT0350119 | | |
| 14" | 8" | 356 | 356 | 171 | 1RT0350120 | | |
| 16" | 14" | 381 | 381 | 267 | 1RT0400118 | | |
| 16" | 12" | 381 | 381 | 244 | 1RT0400119 | | |
| 16" | 10" | 381 | 381 | 228 | 1RT0400120 | | |
| 18" | 16" | 419 | 419 | 310 | 1RT0450100 | | |
| 18" | 14" | 419 | 419 | 287 | 1RT0450101 | | |
| 18" | 12" | 419 | 419 | 263 | 1RT0450102 | | |
| 20" | 16" | 457 | 457 | 372 | 1RT0500118 | | |
| 20" | 14" | 457 | 457 | 347 | 1RT0500119 | | |
| 20" | 12" | 457 | 457 | 323 | 1RT0500120 | | |



PTFE lined reducing T-piece



PFA lined reducing T-piece

Subject to technical changes

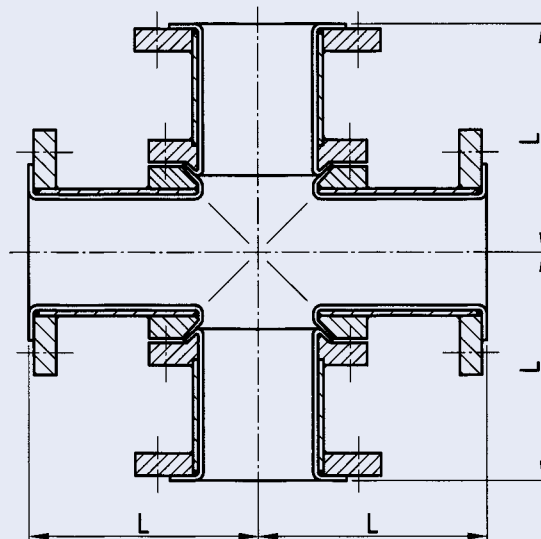
PTFE Lined Crosses

All crosses are available with fixed flanges as standard. Loose flanges can also be supplied on request. PFA lined variants are also available up to 4" diam.. Dimensions meet ANSI B 16.5.

| DN | L | Weight | | Order no. | |
|-----|-----|------------|------------|------------|------------|
| | | PTFE | PFA | white PTFE | white PFA |
| mm | mm | approx. kg | approx. kg | | |
| 1" | 89 | | 5 | | 1KR0025106 |
| 1¼" | 95 | 9 | 6.5 | 1KR0032118 | 1KR0032106 |
| 1½" | 102 | 12 | 8.5 | 1KR0040119 | 1KR0040106 |
| 2" | 114 | 18 | 13 | 1KR0050117 | 1KR0050106 |
| 2½" | 127 | 26 | 17.5 | 1KR0065119 | 1KR0065106 |
| 3" | 140 | 31 | 28 | 1KR0080119 | 1KR0080106 |
| 4" | 165 | 45 | 47 | 1KR0100119 | 1KR0100106 |
| 5" | 190 | 69 | | 1KR0125103 | |
| 6" | 203 | 71 | | 1KR0150103 | |
| 8" | 229 | 115 | | 1KR0200103 | |
| 10" | 279 | 171 | | 1KR0250103 | |
| 12" | 305 | 235 | | 1KR0300103 | |
| 14" | 356 | 322 | | 1KR0350103 | |
| 16" | 381 | 418 | | 1KR0400103 | |
| 18" | 419 | 460 | | 1KR0450100 | |
| 20" | 457 | 565 | | 1KR0500103 | |

Subject to technical changes

Steel pipe dimensions, lining wall thicknesses and flange diameters correspond to the standard dimensions stated on Page 7.

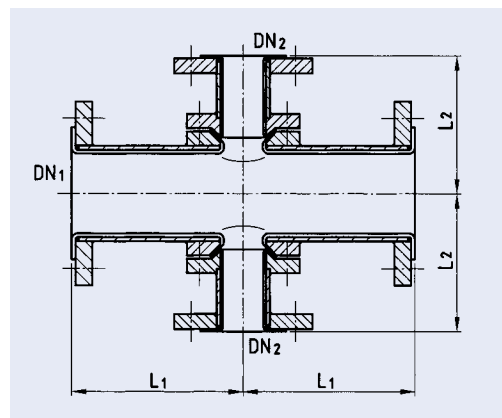


PTFE lined cross

PTFE Lined Reducing Crosses

All crosses are available with fixed flanges as standard. Loose flanges can also be supplied on request.
Dimensions meet ANSI B 16.5.

| DN ₁ | DN ₂ | L ₁ | L ₂ | Weight | | Order no. | |
|-----------------|-----------------|----------------|----------------|--------------------|--------------------|------------|------------|
| | | | | PTFE | PFA | white PTFE | white PFA |
| mm | mm | mm | mm | ap- prox. kg | ap- prox. kg | | |
| 1¼" | 1" | 95 | 95 | 8.5 | 4.5 | 1KR0032182 | 1KR032142 |
| 1½" | 1" | 102 | 102 | 9.3 | 5.2 | 1KR0040162 | 1KR040144 |
| 2" | 1½" | 114 | 114 | 14 | 8.7 | 1KR0050178 | 1KR0050142 |
| 2" | 1" | 114 | 114 | 11 | 8.4 | 1KR0050179 | 1KR0050143 |
| 2½" | 2" | 127 | 127 | 18 | 12 | 1KR0065182 | 1KR0065150 |
| 2½" | 1½" | 127 | 127 | 16 | 11 | 1KR0065183 | 1KR0065151 |
| 3" | 2" | 140 | 140 | 22 | 19 | 1KR0080189 | 1KR0080151 |
| 3" | 1½" | 140 | 140 | 19 | 18 | 1KR0080190 | 1KR0080152 |
| 3" | 1" | 140 | 140 | 16 | 17 | 1KR0080191 | 1KR0080153 |
| 4" | 3" | 165 | 165 | 31 | 34 | 1KR0100189 | 1KR0100151 |
| 4" | 2" | 165 | 165 | 26 | 31 | 1KR0100190 | 1KR0032142 |
| 4" | 1" | 165 | 165 | 22 | 29 | 1KR0100191 | 1KR0100153 |
| 5" | 4" | 190 | 190 | 42 | | 1KR0125128 | |
| 5" | 3" | 190 | 190 | 33 | | 1KR0125129 | |
| 6" | 4" | 203 | 203 | 49 | | 1KR0150128 | |
| 6" | 3" | 203 | 203 | 43 | | 1KR0150129 | |
| 8" | 6" | 229 | 229 | 76 | | 1KR0200124 | |
| 8" | 4" | 229 | 229 | 62 | | 1KR0200125 | |
| 10" | 8" | 279 | 279 | 165 | | 1KR0250128 | |
| 10" | 6" | 279 | 279 | 108 | | 1KR0250129 | |
| 12" | 10" | 305 | 305 | 187 | | 1KR0300134 | |
| 12" | 8" | 305 | 305 | 165 | | 1KR0300135 | |
| 12" | 6" | 305 | 305 | 142 | | 1KR0300136 | |
| 14" | 12" | 356 | 356 | 259 | | 1KR0350134 | |
| 14" | 10" | 356 | 356 | 231 | | 1KR0350135 | |
| 14" | 8" | 356 | 365 | 212 | | 1KR0350136 | |
| 16" | 14" | 381 | 381 | 323 | | 1KR0400134 | |
| 16" | 12" | 381 | 381 | 288 | | 1KR0400135 | |
| 16" | 10" | 381 | 381 | 261 | | 1KR0400136 | |
| 18" | 16" | 419 | 419 | 415 | | 1KR0450104 | |
| 18" | 14" | 419 | 419 | 381 | | 1KR0450105 | |
| 18" | 12" | 419 | 419 | 347 | | 1KR0450106 | |
| 20" | 16" | 457 | 457 | 459 | | 1KR0500134 | |
| 20" | 14" | 457 | 457 | 417 | | 1KR0500135 | |
| 20" | 12" | 457 | 457 | 355 | | 1KR0500136 | |



Steel pipe dimensions, lining wall thicknesses and flange diameters correspond to the standard dimensions stated on Page 7.

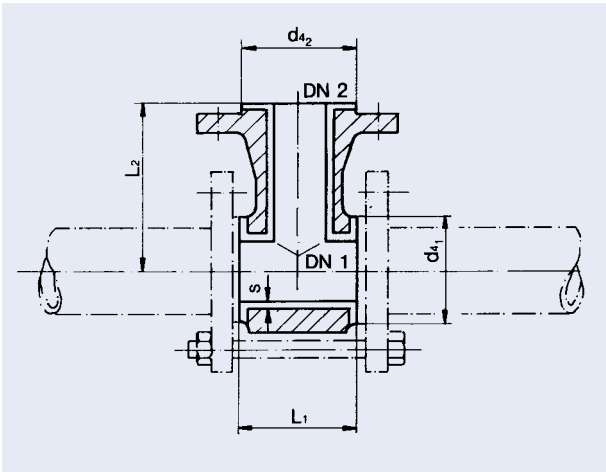
Subject to technical changes

PTFE Lined Instrument Tees

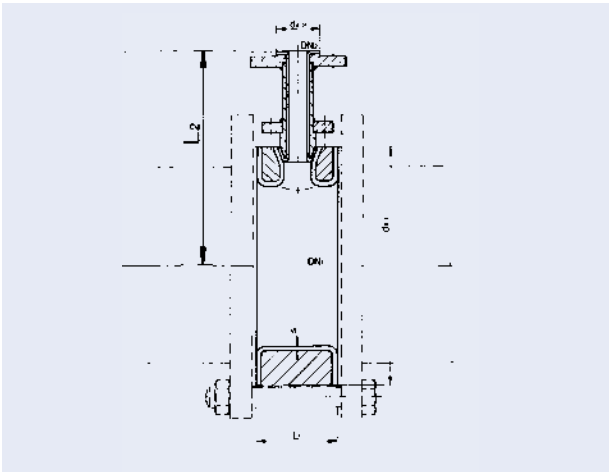
Instrument tees are used to connect manometers or thermometers, and also for sampling.

Instrument tees up to 10" diam. are supplied with a PFA lining. PFA is a tetrafluorethylene-based copolymer with chemical and thermal properties comparable to those of PTFE.

Products of 12" diam. or above are available in POLYFLURON® PTFE lined steel (see table and drawings below). Dimensions meet ASME B 16.5.



10" diameter



12" diameter

| DN1 | DN2 | L ₁ | L ₂ | Weight | Order no. |
|--------|--------|----------------|----------------|------------|------------|
| mm | mm | mm | mm | approx. kg | white PFA |
| 1" | 1" | 50 | 89 | 1.9 | 1ME0025101 |
| 1 1/4" | 1" | 50 | 95 | 2.8 | 1ME0032101 |
| 1 1/2" | 1 1/2" | 75 | 102 | 4.4 | 1ME0040103 |
| 1 1/2" | 1" | 50 | 102 | 2.4 | 1ME0040102 |
| 2" | 2" | 90 | 114 | 8.1 | 1ME0050105 |
| 2" | 1 1/2" | 75 | 114 | 6.2 | 1ME0050104 |
| 2" | 1" | 50 | 114 | 3.2 | 1ME0050103 |
| 2 1/2" | 2" | 90 | 127 | 11 | 1ME0065105 |
| 2 1/2" | 1 1/2" | 75 | 127 | 9 | 1ME0065104 |
| 2 1/2" | 1" | 50 | 127 | 5 | 1ME0065103 |
| 3" | 2" | 90 | 140 | 14 | 1ME0080105 |
| 3" | 1 1/2" | 75 | 140 | 8.3 | 1ME0080104 |
| 3" | 1" | 50 | 140 | 4.3 | 1ME0080103 |

Subject to technical changes

Large diameters are shown on the next page.

PTFE Lined Instrument Tees

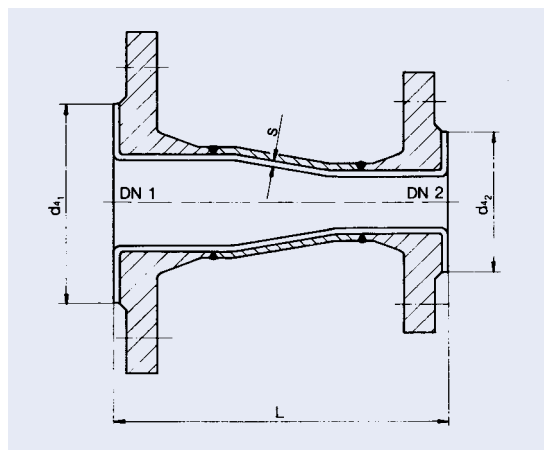
| DN1 | DN2 | L ₁ | L ₂ | Weight | Order no. |
|-----|-----|----------------|----------------|------------|----------------|
| mm | mm | mm | mm | approx. kg | white PFA/PTFE |
| 4" | 2" | 90 | 165 | 17.5 | 1ME0100105 |
| 4" | 1½" | 75 | 165 | 10 | 1ME0100104 |
| 4" | 1" | 50 | 165 | 5.5 | 1ME0100103 |
| 5" | 2" | 90 | 190 | 22 | 1ME0125105 |
| 5" | 1½" | 75 | 190 | 14 | 1ME0125104 |
| 5" | 1" | 50 | 190 | 9 | 1ME0125103 |
| 6" | 2" | 90 | 203 | 24 | 1ME0150105 |
| 6" | 1½" | 75 | 203 | 15 | 1ME0150104 |
| 6" | 1" | 50 | 203 | 7.7 | 1ME0150103 |
| 8" | 2" | 90 | 229 | 26 | 1ME0200105 |
| 8" | 1½" | 75 | 229 | 18 | 1ME0200104 |
| 8" | 1" | 50 | 229 | 11 | 1ME0200103 |
| 10" | 2" | 90 | 279 | 28 | 1ME0250105 |
| 10" | 1½" | 75 | 279 | 24 | 1ME0250104 |
| 10" | 1" | 50 | 279 | 15 | 1ME0250103 |
| 12" | 2" | 120 | 330 | 30 | 1ME0300105 |
| 12" | 1½" | 105 | 330 | 29 | 1ME0300104 |
| 12" | 1" | 90 | 330 | 27 | 1ME0300103 |
| 14" | 2" | 120 | 360 | 44 | 1ME0350105 |
| 14" | 1½" | 105 | 360 | 43 | 1ME0350104 |
| 14" | 1" | 90 | 360 | 42 | 1ME06350103 |
| 16" | 2" | 120 | 390 | 51 | 1ME0400105 |
| 16" | 1½" | 105 | 390 | 49 | 1ME0400104 |
| 16" | 1" | 90 | 390 | 48 | 1ME0400103 |
| 18" | 2" | 120 | 430 | 58 | 1ME0450102 |
| 18" | 1½" | 105 | 430 | 57 | 1ME0450101 |
| 18" | 1" | 90 | 430 | 56 | 1ME0450100 |
| 20" | 2" | 120 | 450 | 66 | 1ME0500105 |
| 20" | 1½" | 105 | 450 | 65 | 1ME0500104 |
| 20" | 1" | 90 | 450 | 64 | 1ME0500103 |
| | | | | | 1ME0600105 |
| | | | | | 1ME0600104 |
| | | | | | 1ME0600103 |

Subject to technical changes

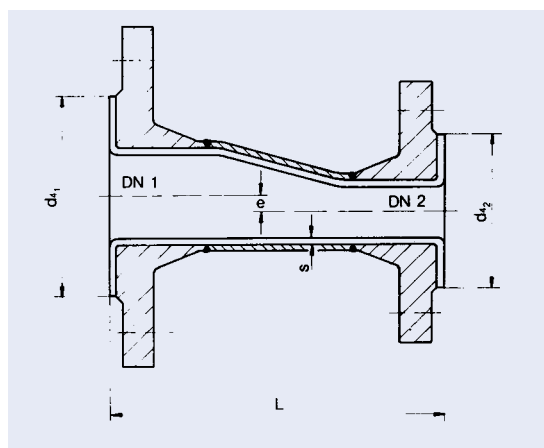
PTFE Lined Reducers

Reducers are used to reduce/ enlarge the pipe diameters in order to improve liquid flow. Eccentric reducers often allow better emptying of pipe systems. Dimensions meet ANSI B 16.5.

| DN1 | DN2 | L | Lining s | Weight | Order no. | |
|-----|-----|-----|-------------|---------------|--------------|--------------|
| mm | mm | mm | mm | approx. kg | Type K | Type E |
| 1" | ¾" | 114 | 3 | 2.4 | 1RK0025102 | 1RE0025102 |
| 1½" | 1" | 114 | 3 | 3.4 | 1RK0040103 | 1RE0040103 |
| 2" | 1" | 127 | 3* | 4.5 | 1RK0050103* | 1RE0050103* |
| 2" | 1½" | 127 | 3 | 5.2 | 1RK0050104 | 1RE0050104 |
| 3" | 1" | 152 | 3.5* | 6.7 | 1RK0080104 | 1RE0080104 |
| 3" | 1½" | 152 | 3.5* | 7.5 | 1RK0080105* | 1RE0080105* |
| 3" | 2" | 152 | 3.5 | 6.9 | 1RK0080106 | 1RE0080106 |
| 3" | 2½" | 152 | 4 | 7.5 | 1RK0080107 | 1RE0080107 |
| 4" | 2" | 178 | 4.5* | 9.9 | 1RK0100103* | 1RE0100103* |
| 4" | 2½" | 178 | 4.5 | 10.6 | 1RK0100104 | 1RE0100104* |
| 4" | 3" | 178 | 4.5 | 13 | 1RK0100105 | 1RE0100105 |
| 6" | 3" | 229 | 5* | 20 | 1RK0150103* | 1RE0150103* |
| 6" | 4" | 229 | 5 | 22 | 1RK0150104 | 1RE0150104 |
| 8" | 4" | 279 | 5* | 31 | 1RK0200103* | 1RE0200103** |
| 8" | 6" | 279 | 5 | 35 | 1RK0200104 | 1RE0200104 |
| 10" | 6" | 305 | 5 | 45 | 1RK0250103 | 1RE0250103** |
| 10" | 8" | 305 | 5 | 52 | 1RK0250104 | 1RE0250104 |
| 12" | 6" | 356 | 5.5** | 62 | 1RK0300103** | 1RE0300103** |
| 12" | 8" | 356 | 5.5 | 69 | 1RK0300104 | 1RE0300104** |
| 12" | 10" | 356 | 5.5 | 76 | 1RK0300105 | 1RE0300105 |
| 14" | 8" | 406 | 5.5** | 70 | 1RK0350103** | 1RE0350103** |
| 14" | 10" | 406 | 5.5** | 91 | 1RK0350104** | 1RE0350104** |
| 14" | 12" | 406 | 5.5 | 105 | 1RK0350105 | 1RE0350105 |
| 16" | 10" | 457 | 5.5** | 98 | 1RK0400103** | 1RE0400103** |
| 16" | 12" | 457 | 5.5** | 115 | 1RK0400104** | 1RE0400104** |
| 16" | 14" | 457 | 5.5 | 125 | 1RK0400105 | 1RE0400105 |
| 18" | 12" | 483 | 5.5** | 135 | 1RK0450100** | 1RE0450100** |
| 18" | 14" | 483 | 5.5** | 149 | 1RK0450101** | 1RE0450101** |
| 18" | 16" | 483 | 5.5 | 160 | 1RK0450102 | 1RE0450102 |
| 20" | 14" | 508 | 5.5** | 168 | 1RK0500103** | 1RE0500103** |
| 20" | 16" | 508 | 5.5** | 180 | 1RK0500104** | 1RE0500104** |
| 20" | 18" | 508 | 5.5 | 190 | 1RK0500105 | 1RE0500105 |



Type K



Type E

Single-part paste-extruded PTFE lining

* isostatic PTFE or PFA lining

** two-part paste-extruded PTFE lining

Subject to technical changes

PTFE lined Reducing Flanges

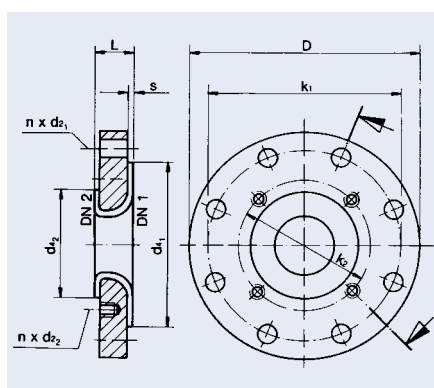
Reducing flanges are provided with holes as shown below (smaller diameter flanges are always threaded):

Type A: With clearance holes for larger nominal diameters

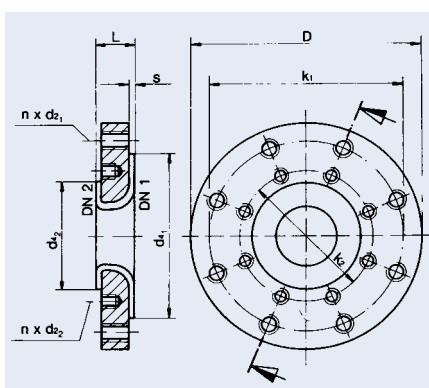
Type B: With threaded holes for both nominal diameters

Type C: With threaded holes, holes on small diameter side are not straddled

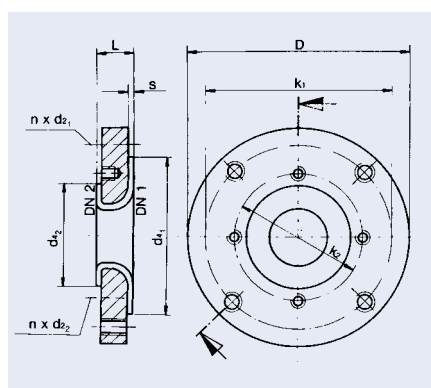
Connections to diameters of 1 1/4", 2 1/2" and 5", as well as larger dimensions and diameter combinations not stated here, can also be supplied on request.



Type A



Type B



Type C

| DN1 | DN2 | L | s | PTFE | | D | k ₁ | Metal | | | Weight | Type | Order no. |
|--------|--------|----|----|-----------------|-----------------|-------|----------------|---------------------|----------------|---------------------|------------|------|------------|
| mm | mm | mm | mm | d ₄₁ | d ₄₂ | | | n x d ₂₁ | k ₂ | n x d ₂₂ | approx. kg | | |
| 1" | 3/4" | 25 | 3 | 51 | 43 | 108 | 79.4 | 4 x 1/2" UNC | 69.8 | 4 x 1/2" UNC | 1.5 | C | 1RF0025102 |
| 1 1/2" | 1" | 25 | 3 | 73 | 51 | 127 | 98.4 | 4 x 1/2" UNC | 79.4 | 4 x 1/2" UNC | 1.9 | C | 1RF0040120 |
| 2" | 1" | 25 | 3 | 92 | 51 | 152.4 | 120.6 | 4 x 5/8" UNC | 79.4 | 4 x 1/2" UNC | 2.9 | B | 1RF0050104 |
| 2" | 1 1/2" | 25 | 3 | 92 | 73 | 152.4 | 120.6 | 4 x 5/8" UNC | 98.4 | 4 x 1/2" UNC | 2.7 | C | 1RF0050105 |
| 3" | 1" | 30 | 4 | 127 | 51 | 190.5 | 152.4 | 4 x Ø 19 | 120.6 | 4 x 5/8" UNC | 5.5 | A | 1RF0080105 |
| 3" | 1 1/2" | 30 | 4 | 127 | 73 | 190.5 | 152.4 | 4 x 5/8" UNC | 98.6 | 4 x 1/2" UNC | 5.3 | B | 1RF0080106 |
| 3" | 2" | 30 | 4 | 127 | 92 | 190.5 | 152.4 | 4 x 5/8" UNC | 120.6 | 4 x 5/8" UNC | 5.2 | C | 1RF0080107 |
| 4" | 1" | 30 | 3 | 157 | 51 | 228.6 | 190.5 | 8 x Ø 19 | 79.4 | 4 x 1/2" UNC | 8 | A | 1RF0100106 |
| 4" | 1 1/2" | 30 | 4 | 157 | 73 | 228.6 | 190.5 | 8 x Ø 19 | 98.4 | 4 x 1/2" UNC | 7.8 | A | 1RF0100107 |
| 4" | 2" | 30 | 4 | 157 | 92 | 228.6 | 190.5 | 8 x Ø 19 | 120.6 | 4 x 5/8" UNC | 7.6 | A | 1RF0100108 |
| 4" | 3" | 30 | 5 | 157 | 127 | 228.6 | 190.5 | 8 x 5/8" UNC | 152.4 | 4 x 5/8" UNC | 6.6 | B | 1RF0100110 |
| 6" | 1" | 35 | 3 | 216 | 51 | 279.4 | 241.3 | 8 x Ø 22.2 | 79.4 | 4 x 1/2" UNC | 12 | A | 1RF0150108 |
| 6" | 1 1/2" | 35 | 4 | 216 | 73 | 279.4 | 241.3 | 8 x Ø 22.2 | 98.4 | 4 x 1/2" UNC | 13 | A | 1RF0150109 |
| 6" | 2" | 35 | 4 | 216 | 92 | 279.4 | 241.3 | 8 x Ø 22.2 | 120.6 | 4 x 5/8" UNC | 13 | A | 1RF0150110 |
| 6" | 3" | 35 | 5 | 216 | 127 | 279.4 | 241.3 | 8 x Ø 22.2 | 152.4 | 4 x 5/8" UNC | 12 | A | 1RF0150111 |
| 6" | 4" | 35 | 5 | 216 | 157 | 279.4 | 241.3 | 8 x 3/4" UNC | 190.5 | 8 x 5/8" UNC | 11 | B | 1RF0150112 |

Subject to technical changes

PTFE lined Reducing Flanges

| DN1 | DN2 | L | PTFE | | | | | Metal | | | Weight | Type | Order no. |
|-----|-----|----|------|-----------------|-----------------|-------|----------------|---------------------|----------------|---------------------|---------------|------|------------|
| | | | s | d4 ₁ | d4 ₂ | D | k ₁ | n x d2 ₁ | k ₂ | n x d2 ₂ | | | |
| mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | approx. kg | | PTFE |
| 8" | 2" | 35 | 4 | 270 | 92 | 342.9 | 298.4 | 8 x Ø 22.2 | 120.6 | 4 x 5/8" UNC | 19 | A | 1RF0200107 |
| 8" | 3" | 35 | 5 | 270 | 127 | 342.9 | 298.4 | 8 x Ø 22.2 | 152.4 | 4 x 5/8" UNC | 18 | A | 1RF0200108 |
| 8" | 4" | 35 | 5 | 270 | 157 | 342.9 | 298.4 | 8 x Ø 22.2 | 190.5 | 8 x 5/8" UNC | 17 | A | 1RF0200109 |
| 8" | 6" | 35 | 5 | 270 | 216 | 342.9 | 298.4 | 8 x ¾" UNC | 241.3 | 8 x ¾" UNC | 15 | B | 1RF0200111 |
| 10" | 2" | 35 | 5 | 324 | 92 | 406.4 | 361.9 | 12 x Ø 25.4 | 120.6 | 4 x 5/8" UNC | 27 | A | 1RF0250107 |
| 10" | 3" | 35 | 5 | 324 | 127 | 406.4 | 361.9 | 12 x Ø 25.4 | 152.4 | 4 x 5/8" UNC | 26 | A | 1RF0250108 |
| 10" | 4" | 35 | 5 | 324 | 157 | 406.4 | 361.9 | 12 x Ø 25.4 | 190.5 | 8 x 5/8" UNC | 25 | A | 1RF0250109 |
| 10" | 6" | 35 | 5 | 324 | 216 | 406.4 | 361.9 | 12 x Ø 25.4 | 241.3 | 8 x ¾" UNC | 23 | A | 1RF0250111 |
| 10" | 8" | 35 | 5 | 324 | 270 | 406.4 | 361.9 | 12 x 7/8" UNC | 298.4 | 8 x ¾" UNC | 20 | B | 1RF0250112 |
| 12" | 2" | 40 | 5 | 381 | 92 | 482.6 | 431.8 | 12 x Ø 25.4 | 120.6 | 4 x 5/8" UNC | 46 | A | 1RF0300107 |
| 12" | 3" | 40 | 5 | 381 | 127 | 482.6 | 431.8 | 12 x Ø 25.4 | 152.4 | 4 x 5/8" UNC | 45 | A | 1RF0300108 |
| 12" | 4" | 40 | 5 | 381 | 157 | 482.6 | 431.8 | 12 x Ø 25.4 | 190.5 | 8 x 5/8" UNC | 44 | A | 1RF0300109 |
| 12" | 6" | 40 | 5 | 381 | 216 | 482.6 | 431.8 | 12 x Ø 25.4 | 241.3 | 8 x ¾" UNC | 41 | A | 1RF0300110 |
| 12" | 8" | 40 | 5 | 381 | 270 | 482.6 | 431.8 | 12 x Ø 25.4 | 298.4 | 8 x ¾" UNC | 38 | A | 1RF0300111 |
| 12" | 10" | 40 | 5 | 381 | 324 | 482.6 | 431.8 | 12 x 7/8" UNC | 361.9 | 12 x 7/8" UNC | 33 | B | 1RF0300112 |
| 14" | 4" | 40 | 5 | 413 | 157 | 533.4 | 476.2 | 12 x Ø 28.6 | 190.5 | 8 x 5/8" UNC | 54 | A | 1RF0350106 |
| 14" | 6" | 40 | 5 | 413 | 216 | 533.4 | 476.2 | 12 x Ø 28.6 | 241.3 | 8 x ¾" UNC | 51 | A | 1RF0350108 |
| 14" | 8" | 40 | 5 | 413 | 270 | 533.4 | 476.2 | 12 x Ø 28.6 | 298.4 | 8 x ¾" UNC | 48 | A | 1RF0350109 |
| 14" | 10" | 40 | 5 | 413 | 324 | 533.4 | 476.2 | 12 x Ø 28.6 | 361.9 | 12 x 7/8" UNC | 43 | A | 1RF0350110 |
| 14" | 12" | 40 | 5 | 413 | 381 | 533.4 | 476.2 | 12 x 1" UNC | 431.8 | 12 x 7/8" UNC | 37 | C | 1RF0350111 |
| 16" | 6" | 45 | 5 | 470 | 216 | 596.9 | 539.7 | 16 x Ø 28.6 | 241.3 | 8 x ¾" UNC | 72 | A | 1RF0400106 |
| 16" | 8" | 45 | 5 | 470 | 270 | 596.9 | 539.7 | 16 x Ø 28.6 | 298.4 | 8 x ¾" UNC | 68 | A | 1RF0400107 |
| 16" | 10" | 45 | 5 | 470 | 324 | 596.9 | 539.7 | 16 x Ø 28.6 | 361.9 | 12 x 7/8" UNC | 63 | A | 1RF0400108 |
| 16" | 12" | 45 | 5 | 470 | 381 | 596.9 | 539.7 | 16 x Ø 28.6 | 431.8 | 12 x 7/8" UNC | 57 | A | 1RF0400109 |
| 16" | 14" | 45 | 5 | 470 | 413 | 596.9 | 539.7 | 16 x 1" UNC | 476.2 | 12 x 1" UNC | 52 | B | 1RF0400110 |
| 18" | 8" | 45 | 5 | 533 | 270 | 635 | 577.8 | 16 x Ø 31.7 | 298.4 | 8 x ¾" UNC | 80 | A | 1RF0450100 |
| 18" | 10" | 45 | 5 | 533 | 324 | 635 | 577.8 | 16 x Ø 31.7 | 361.9 | 12 x 7/8" UNC | 74 | A | 1RF0450101 |
| 18" | 12" | 45 | 5 | 533 | 381 | 635 | 577.8 | 16 x Ø 31.7 | 431.8 | 12 x 7/8" UNC | 68 | A | 1RF0450102 |
| 18" | 14" | 45 | 5 | 533 | 413 | 635 | 577.8 | 16 x 1 1/8" 8UN | 476.2 | 12 x 1" UNC | 64 | B | 1RF0450103 |
| 18" | 16" | 45 | 5 | 533 | 470 | 635 | 577.8 | 16 x 1 1/8" 8UN | 539.7 | 16 x 1" UNC | 56 | C | 1RF0450104 |
| 20" | 10" | 45 | 5 | 584 | 324 | 698.5 | 635 | 20 x Ø 31.7 | 361.9 | 12 x 7/8" UNC | 93 | A | 1RF0500106 |
| 20" | 12" | 45 | 5 | 584 | 381 | 698.5 | 635 | 20 x Ø 31.7 | 431.8 | 12 x 7/8" UNC | 87 | A | 1RF0500107 |
| 20" | 14" | 45 | 5 | 584 | 413 | 698.5 | 635 | 20 x Ø 31.7 | 476.2 | 12 x 1" UNC | 83 | A | 1RF0500108 |
| 20" | 16" | 45 | 5 | 584 | 470 | 698.5 | 635 | 20 x 1 1/8" 8UN | 539.7 | 16 x 1" UNC | 75 | B | 1RF0500109 |
| 24" | 12" | 50 | 5 | 692 | 381 | 812.8 | 749.3 | 20 x Ø 35 | 431.8 | 12 x 7/8" UNC | 135 | A | 1RF0600106 |
| 24" | 14" | 50 | 5 | 692 | 413 | 812.8 | 749.3 | 20 x Ø 35 | 476.2 | 12 x 1" UNC | 128 | A | 1RF0600107 |
| 24" | 16" | 50 | 5 | 692 | 470 | 812.8 | 749.3 | 20 x Ø 35 | 539.7 | 16 x 1" UNC | 120 | A | 1RF0600108 |
| 24" | 18" | 50 | 5 | 692 | 533 | 812.8 | 749.3 | 20 x Ø 35 | 577.8 | 16 x 1 1/8" 8NC | 110 | A | 1RF0600109 |

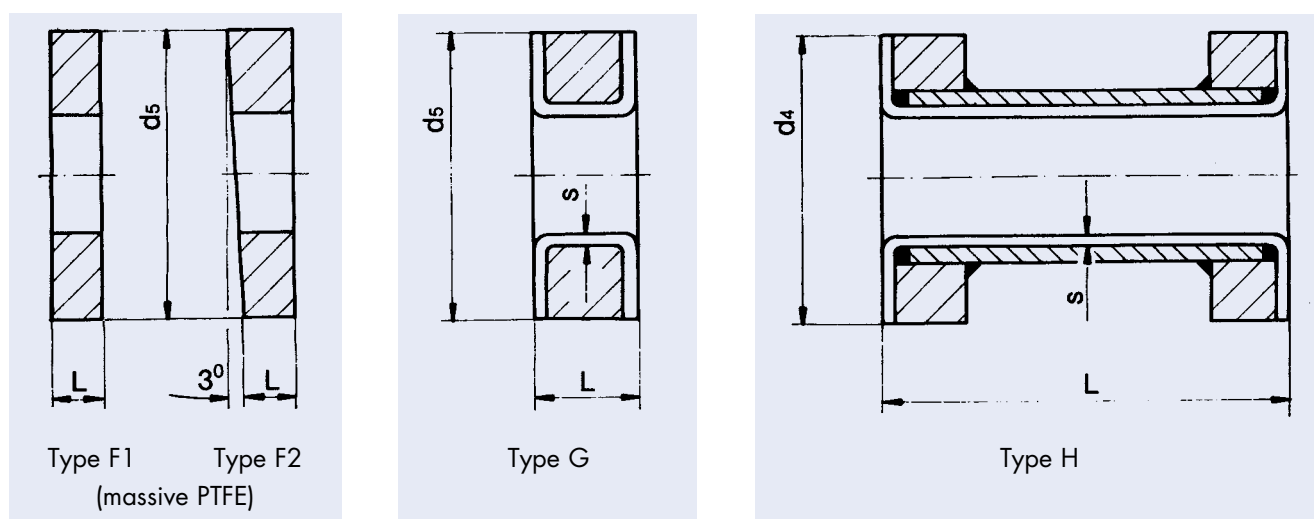
Subject to technical changes

PTFE and PTFE lined Spacers

Spacers are used to compensate for deviations in the assembly of pipe systems. Depending on their size, they can be manufactured either from massive PTFE or PTFE lined steel. The different designs are named Type F, G and H.

Their specific designs are shown in the illustrations below.

Please refer to the table below and on the opposite page for dimensional details of the three spacer types. Nominal diameters of 1 1/4", 2 1/2" and 5" are also available.



| DN 1 | Type F 1 / 2 * | Length of | | | PTFE | | Weight | Order no. |
|--------|----------------|-----------|--------|-----|------|-----|------------|------------|
| mm | mm | Type G | Type H | s | d4 | d5 | approx. kg | PTFE |
| 1" | 10 | | | | | 63 | 0.1 | 1PA0025112 |
| 1" | | 25 | | 3 | | 63 | 0.5 | 1PA0025115 |
| 1" | | 50 | | 3 | | 63 | 1.2 | 1PA0025118 |
| 1" | | | 75 | 3 | 51 | | 0.7 | 1PA0025120 |
| 1 1/2" | 10 | | | | | 82 | 0.1 | 1PA0040113 |
| 1 1/2" | | 25 | | 3 | | 82 | 1 | 1PA0040116 |
| 1 1/2" | | 50 | | 3 | | 82 | 1.8 | 1PA0040119 |
| 1 1/2" | | | 75 | 3 | 73 | | 1.1 | 1PA0040122 |
| 2" | 10 | | | | | 102 | 0.1 | 1PA0050113 |
| 2" | | 25 | | 3 | | 102 | 1.4 | 1PA0050116 |
| 2" | | 50 | | 3 | | 102 | 2.3 | 1PA0050119 |
| 2" | | | 75 | 3 | 92 | | 1.6 | 1PA0050122 |
| 3" | 10 | | | | | 133 | 0.2 | 1PA0080112 |
| 3" | | 25 | | 3.5 | | 133 | 2.1 | 1PA0080115 |
| 3" | | 50 | | 3.5 | | 133 | 3.6 | 1PA0080118 |
| 3" | | | 75 | 3.5 | 127 | | 2.8 | 1PA0080275 |
| 3" | | | 100 | 3.5 | 127 | | 3 | 1PA0080123 |

* please state F 1 or F 2

Subject to technical changes

PTFE and PTFE lined Spacers

| DN 1 | Length of | | Type H | s | PTFE | | Weight | Order no. |
|------|----------------|--------|--------|-----|------|-----|------------|------------|
| | Type F 1 / 2 * | Type G | | | d4 | d5 | | |
| mm | mm | mm | mm | mm | mm | mm | approx. kg | PTFE |
| 4" | 10 | | | | | 172 | 0.2 | 1PA0100113 |
| 4" | | 25 | | 4.5 | | 172 | 2.5 | 1PA0100116 |
| 4" | | 50 | | 4.5 | | 172 | 5 | 1PA0100119 |
| 4" | | | 75 | 4.5 | 157 | | 3.5 | 1PA0100122 |
| 4" | | | 100 | 4.5 | 157 | | 3.8 | 1PA0100125 |
| 6" | 10 | | | | | 219 | 0.4 | 1PA0150113 |
| 6" | | 25 | | 5 | | 219 | 3.9 | 1PA0150116 |
| 6" | | 50 | | 5 | | 219 | 7.2 | 1PA0150119 |
| 6" | | | 75 | 5 | 216 | | 6 | 1PA0150122 |
| 6" | | | 100 | 5 | 216 | | 6.5 | 1PA0150125 |
| 8" | 10 | | | | | 276 | 0.6 | 1PA0200113 |
| 8" | | 25 | | 5 | | 276 | 5.3 | 1PA0200116 |
| 8" | | 50 | | 5 | | 276 | 11 | 1PA0200119 |
| 8" | | | 75 | 5 | 270 | | 15 | 1PA0200122 |
| 8" | | | 100 | 5 | 270 | | 9.8 | 1PA0200125 |
| 10" | | 25 | | 5 | | 337 | 7 | 1PA0250116 |
| 10" | | 50 | | 5 | | 337 | 13 | 1PA0250119 |
| 10" | | 75 | | 5 | | 337 | 18 | 1PA0250122 |
| 10" | | | 100 | 5 | 324 | | 13 | 1PA0250125 |
| 12" | | 25 | | 5.5 | | 407 | 8.2 | 1PA0300116 |
| 12" | | 50 | | 5.5 | | 407 | 15 | 1PA0300119 |
| 12" | | 75 | | 5.5 | | 407 | 21 | 1PA0300122 |
| 12" | | | 100 | 5.5 | 381 | | 16 | 1PA0300125 |
| 14" | | 25 | | 5.5 | | 447 | 14 | 1PA0350116 |
| 14" | | 50 | | 5.5 | | 447 | 28 | 1PA0350119 |
| 14" | | 75 | | 5.5 | | 447 | 42 | 1PA0350122 |
| 14" | | | 100 | 5.5 | 413 | | 22 | 1PA0350125 |
| 16" | | 25 | | 5.5 | | 511 | 18 | 1PA0400116 |
| 16" | | 50 | | 5.5 | | 511 | 36 | 1PA0400119 |
| 16" | | 75 | | 5.5 | | 511 | 54 | 1PA0400122 |
| 16" | | | 100 | 5.5 | 470 | | 27 | 1PA0400125 |
| 18" | | 25 | | 5.5 | | 546 | 19 | - |
| 18" | | 50 | | 5.5 | | 546 | 39 | - |
| 18" | | 75 | | 5.5 | | 546 | 59 | - |
| 18" | | | 100 | 5.5 | 533 | | 34 | - |
| 20" | | 25 | | 6 | | 603 | 21 | 1PA0500116 |
| 20" | | 50 | | 6 | | 603 | 42 | 1PA0500119 |
| 20" | | 75 | | 6 | | 603 | 64 | 1PA0500122 |
| 20" | | | 100 | 6 | 584 | | 38 | 1PA0500125 |
| 24" | | 25 | | 6 | | 714 | 21 | 1PA0600116 |
| 24" | | 50 | | 6 | | 714 | 40 | 1PA0600119 |
| 24" | | 75 | | 6 | | 714 | 65 | 1PA0600122 |

* please state F 1 or F 2

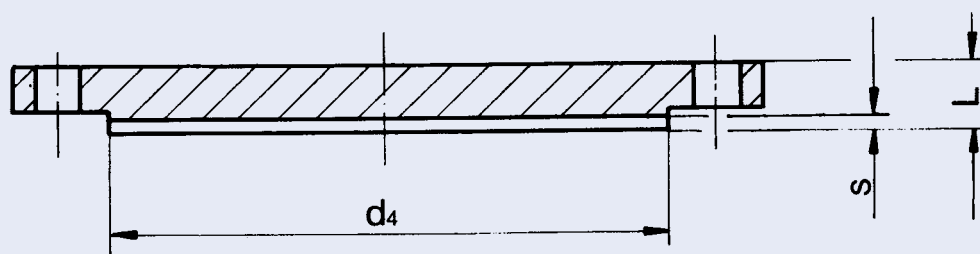
Subject to technical changes

PTFE Lined Blind Flanges

The POLYFLURON® PTFE lining is fixed to the steel surface to prevent it from separating during transport and assembly. Sealing surfaces meet ANSI B16.5.

| DN | L | PTFE s | Weight | Order no. |
|-----|----|-----------|------------|------------|
| mm | mm | mm | approx. kg | PTFE |
| 1" | 17 | 3 | 0,9 | 1BF0025101 |
| 1¼" | 19 | 3 | 1,3 | 1BF0032101 |
| 1½" | 21 | 3 | 1,8 | 1BF0040101 |
| 2" | 22 | 3 | 2,3 | 1BF0050101 |
| 2½" | 25 | 3 | 3,2 | 1BF0065101 |
| 3" | 27 | 3 | 4,1 | 1BF0080101 |
| 4" | 27 | 3 | 7,7 | 1BF0100101 |
| 5" | 28 | 4 | 9,2 | 1BF0125101 |
| 6" | 29 | 4 | 12 | 1BF0150101 |
| 8" | 33 | 4 | 21 | 1BF0200101 |
| 10" | 35 | 5 | 32 | 1BF0250101 |
| 12" | 37 | 5 | 51 | 1BF0300101 |
| 14" | 40 | 5 | 65 | 1BF0350101 |
| 16" | 42 | 5 | 83 | 1BF0400101 |
| 18" | 45 | 5 | 95 | 1BF0450100 |
| 20" | 48 | 5 | 102 | 1BF0500101 |
| 24" | 53 | 5 | 132 | 1BF0600100 |

Subject to technical changes



Quality Management by Process Technology

As a manufacturer of carbon and graphite products, process equipment and systems for the chemical industry and environmental protection technology, SGL Group maintains a targeted quality management system designed to attain and meet the product quality standards demanded by customers. Our quality management system meets the requirements of DIN EN ISO 9001:2000 and Pressure Equipment Directive 97/23/EC Annex III, Module H/H1 and has been certified by the approved associations of DQS and TÜV SÜD. In process equipment construction, Quality Management is responsible for the testing and approval of semi-finished graphite products, impregnating resin, cement components, outsourced parts, process equipment and components.



Heat exchanger during pressure testing

Synthetic resin impregnation, cementing and assembly are all subject to continuous monitoring. Appropriate marking of the semi-finished graphite products before and after synthetic resin impregnation, during machining and thereafter until assembly of the complete equipment or plant provides comprehensive evidence of the semi-finished products employed. Consequently, they meet the traceability requirement of specification AD 2000-Merkblatt N2 for pressure vessels made from electrographite and hard burned carbon. The conditions for synthetic resin impregnation of the semi-finished graphite products and those for cementing of the components are stipulated, monitored and checked.

Evidence of the quality characteristics of the material grades employed, as required by specification AD 2000-Merkblatt N2, is provided in a report issued by the testing laboratory of TÜV SÜD Industrie Service GmbH.



Process Technology Brochures

- ▶ **Process Technology – We Combat Corrosion –
from Process Equipment and Components to Complex Systems**
 - ▶ **DIABON® Graphite for Engineered Process Equipment**
 - ▶ **DIABON® Shell and Tube Heat Exchangers**
 - ▶ **DIABON® Block Heat Exchangers**
 - ▶ **DIABON® Plate Heat Exchangers**
 - ▶ **DIABON® Economizers for Heat Recovery**
 - ▶ **DIABON® and LICUFLON® Columns and Column Internals**
 - ▶ **DIABON® Hydrogen Chloride Synthesis Plants**
 - ▶ **DIABON® and Exotic Metal Pumps**
 - ▶ **DIABON® Safety Disks**
 - ▶ **Systems – Solutions for Corrosive Processes**
 - ▶ **ECOPOR® Porous Burners**
-
- ▶ **FLUROFLEX® POLYFLURON®-PTFE Bellows DIN/ASME**
 - ▶ **FLUROPIPE® ANJA Safety Tapes**
 - ▶ **FLUROPIPE® POLYFLURON®-PTFE lined Steel Pipes and Fittings DIN**
 - ▶ **FLUROPIPE® POLYFLURON®-PTFE lined Steel Pipes and Fittings ASME**
 - ▶ **FLUROPIPE® POLYFLURON®-PTFE lined Dip Pipes DIN/ASME**
 - ▶ **FLUROSIC® Silicon Carbide Plate & Frame Heat Exchanger**
 - ▶ **FLUROSIC® Silicon Carbide Shell & Tube Heat Exchanger**

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The data contained herein represent the current state of our product knowledge and are intended to provide general information on our products and their application spectra. In view of the variety and large number of application possibilities, these data should be regarded merely as general information that gives no guarantee of any specific properties and/or suitability of those products for any particular application. Consequently, when ordering a product, please contact us for specific information on the properties required for the application concerned. On request, our technical service will supply a profile of characteristics for your specific application requirements without delay.

Process Technology

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