

RESISTOFLEX GMBH flanged pipe, fittings and hoses are all without exception lined with seamless fluorocarbon resins like PTFE (Polytetrafluorethylen) and PFA (Perfluoralkoxy). This leads to the most advanced linings which are attainable.

## 1. Introduction

The patented THERMOLOCK-Process guarantees, in connection with 50 years of practice and manufacturing, world-wide top quality and therefore a high factor of safety and a very long life of the installed parts.

RESISTOFLEX-PTFE-linings are relaxed and braced thermally inside the housings. This compensates the different expansion factors between steel and "FLUOROFLEX"-PTFE and no folds or cracks will occur.

Modern quality assurance methods are used which create repeatable quality over the future years.

RESISTOFLEX GMBH have the TÜV-approval according to ISO 9001:2000. Furthermore we offer "CE-certificates" for all lined pipe and fittings, acc. to category III. Many checks and production supervision are existing such as incoming goods, raw materials, semifinished products and final testing.

At some departments EDP supported data are elaborated or stored.

The existing catalogue with all of its principle drawings shows the offered products and data. Furthermore it is information for producers, distributors and users and to promote understanding between buyers and sellers.

The nominal pipe size NPS is mainly used as criterion. Based on technical reasons these NPS correspond only approximately to the true inside diameters of the lined pipe and fittings

### 2.1 Product range

RESISTOFLEX GMBH offers flanged pipe, fittings, chemical transfer hoses etc. as per the following range:

- Nominal pipe size DN 015 to DN 600
- Nominal pipe size NPS 1/2" to NPS 24"
- particular pipe spools up to DN 600 / NPS 24"
- products acc. to DIN 2848 / 2874, reduced correlation utilized.
- products acc. to ASME / ANSI B16.5 Class 150 and 300
- other pressure classes in DIN as PN16 , PN25 or PN 40
- lined pipe in single length of 6 meters / 20 feet
- variable wall thickness of liners up to 15 mm / 0,6 inch
- high vacuum resistance of all sizes
- homogeneous, seamless linings
- all parts are in electrostatically nonchargeable PTFE or PFA available
- working ranges from -30°C / -20°F to +260°C / +440°F

Please take single values from the product data sheets and the technical data.

## 2. Technical Data

### 2.2 Linings

Only virgin fluorocarbon resins will be used. They meet the following specifications :

- |                       |                                |
|-----------------------|--------------------------------|
| - ASTM D-4894         | Granular resin PTFE            |
| - ASTM D-4895         | Paste / fine powder resin PTFE |
| - ASTM D-3307 Type II | PFA                            |
| - DIN 2874            | Flanged pipe and fittings      |
| - GKV                 | Quality requirements           |

The linings and dimensions meet :

- |               |            |
|---------------|------------|
| - DIN 2848    | PTFE / PFA |
| - ASTM F-1545 | PTFE / PFA |

The temperature rates for PTFE and PFA lined parts are between -30°C / -20°F and +260°C / +440°F. Owing to the shape or reinforcement these temperature rates may be reduced on some of the products.

As a rule PTFE parts are manufactured in virgin white. Black coloured paste liners are also available.

PFA parts are in virgin opaque.

Electrically conductive linings from PTFE are dark black.

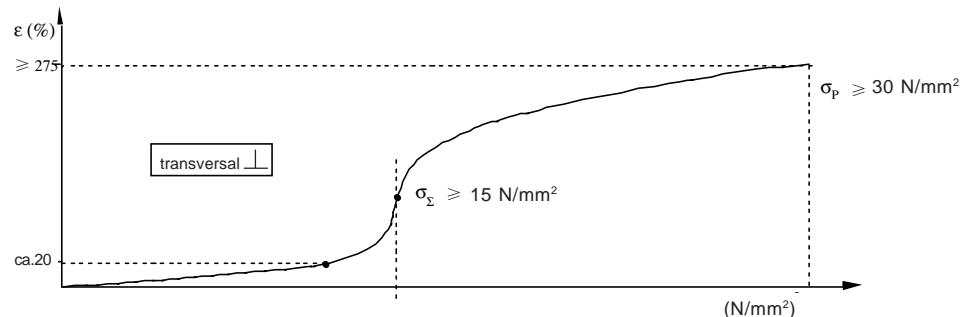
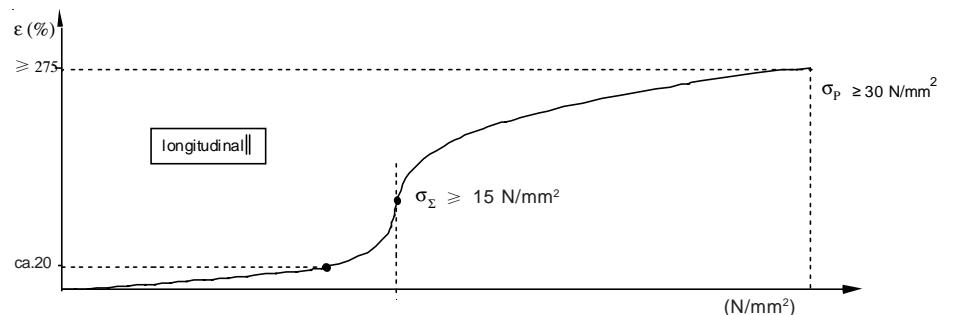
### 3.1 Physical Values

Physical values are taken from semi-finished products, tensile specimen or films, after production by RESISTOFLEX GMBH. Chemical and physical resistance are acc. to ASTM - D 543. If you need more information, we will obtain this from the resin manufacturers.

### 3. General properties of virgin PTFE and PFA

| Property                                | Unit   | Value PTFE-Granulat white | Value PTFE-Paste white | Value PFA              | Method of Inspection            |
|---|--|---------------------------|------------------------|------------------------|---------------------------------|
| specific gravity                        | gr / cm <sup>3</sup>   | 2,13 – 2,18               | 2,13 – 2,18            | 2,13 – 2,16            | DIN 53 479                      |
| tensile strength                        | N / mm <sup>2</sup>  | ≥ 25                      | ≥ 26                   | ≥ 21                   | DIN 53 455 / SPI FD-105         |
| elongation                              | %  | ≥ 270                     | ≥ 275                  | ≥ 250                  | DIN 53 455 / SPI FD-105         |
| tensile Modulus                         | N / mm <sup>2</sup>  | 750                       | 750                    | 700                    | DIN 53 457                      |
| compressive strength :                  |  |                           |                        |                        |                                 |
| 1% yield point                          | N / mm <sup>2</sup>  | 4,5                       | 4,5                    | 5                      | DIN 53 454                      |
| 10% yield point                         | N / mm <sup>2</sup>  | 18                        | 18                     | 20                     |                                 |
| thermal conductivity                    | W / m x K  | 0,35                      | 0,35                   | 0,35                   | DIN 52612                       |
| coefficient of linear thermal expansion | K <sup>-1</sup>  | $17 \times 10^{-5}$       | $17 \times 10^{-5}$    | $17,5 \times 10^{-5}$  | DIN 52 328                      |
| surface resistivity                     |  | $10^{12 \pm 2}$           | $10^{12 \pm 2}$        | $5 \times 10^{14}$     | DIN 53 482                      |
| volume resistivity                      |  | $10^{12 \pm 2}$           | $10^{12 \pm 2}$        | $10^{16}$              | DIN 53 482                      |
| flammability                            | cm / min   | self-extinguishing        |                        |                        | DIN 53 459                      |
| permeability qG                         | $\frac{\text{cm}^3}{\text{m}^2 \times 24\text{h} \times \text{bar}}$ | 300 - 1000                | 300 - 1000             | 2000                   | DIN 53 380 / 53536              |
| permeability coeff. PG                  | $\frac{\text{cm}^3}{\text{m} \times \text{sec} \times \text{cmHG}}$  | (1-3) $\times 10^{-6}$    | (1-3) $\times 10^{-6}$ | (1-3) $\times 10^{-6}$ | thickness of sample<br>s = 2 mm |

### 3.2 Tensile-/elongation diagrams of PTFE-finepowder, s=2,4 mm, sample acc. to SPI FD-105.



### 3.3 Administration registered application

Fluoropolymer resins PTFE and PFA used by RESISTOFLEX GmbH for linings are also selected acc. to a.) production in compliance with the "Federal Clean Air Amendment" of 1990 and are not damaging to the environment nor must carry labels and b.) are released as articles intended to contact food, as indicated below.

- 90 / 128 / EWG, 92 / 39 / EWG, 93 / 9 / EWG,
- Bedarfsgegenständeverordnung vom 10.04.92,
- FDA 21 CFR 177.1550

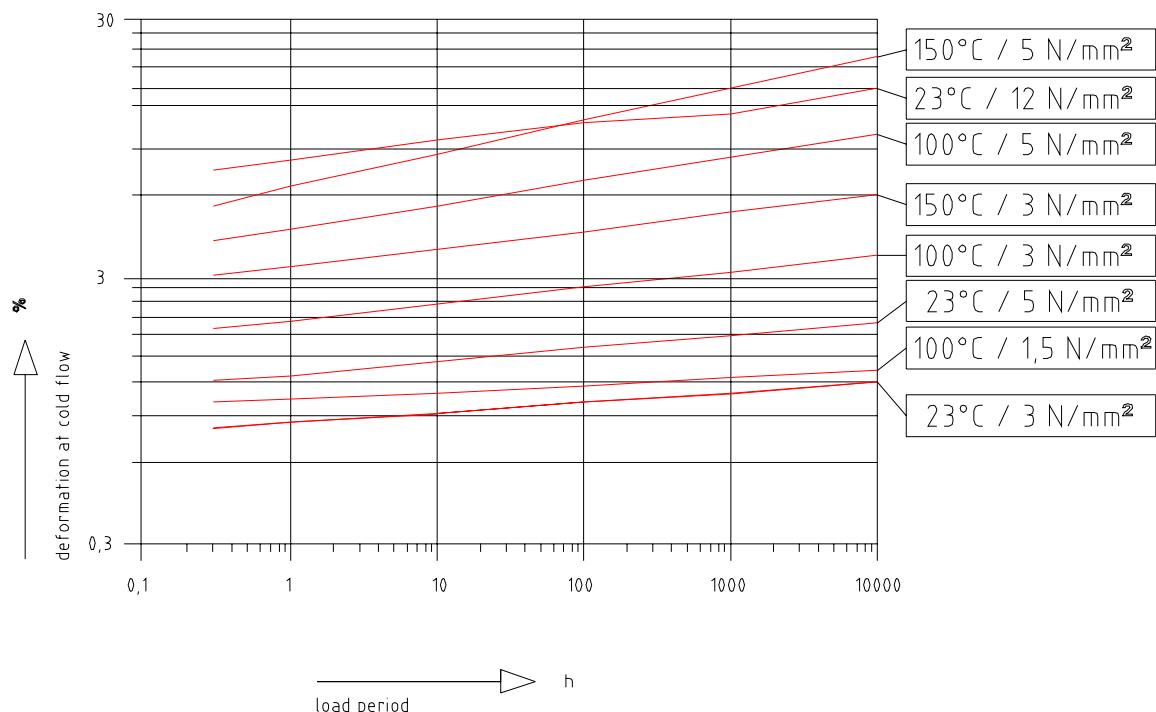
The responsibility for testing and for suitability of the products, shipped by us regarding the application or installation remains with the user.

Medical applications are not allowed without permission.

As far as admixtures exist in the linings, they consist of industrial manufactured amorphous carbon black or are authorized acc. to the above mentioned licences.

### 3.4 Time yield limit

of PTFE - liner between +23°C and +150°C



### 3.5 Maximum pressure ratings

The chart below indicates the maximum pressure ratings for fluorcarbon plastic lined carbon steel pipe and fittings.

| At Temperature ( ° C ) | ANSI class 150 ( bar / psig ) | ANSI class 300 ( bar / psig ) |
|------------------------|-------------------------------|-------------------------------|
| 40                     | 17,6 / 250                    | 31,6 / 450                    |
| 70                     | 17 / 242                      | 29,2 / 415                    |
| 100                    | 16,5 / 235                    | 27,4 / 390                    |
| 150                    | 15,1 / 215                    | 24,3 / 345                    |
| 200                    | 14 / 200                      | 20,8 / 295                    |
| 250                    | 12 / 170                      | 17,2 / 245                    |

#### **4.1 Steel pipe**

Steel pipe are either seamless or welded.

They meet the following specifications :

- ASTM A-106, Gr. B
- ASTM A-587
- ASTM A-53
- ASTM A-234 Gr. WPB; SAE 1010-103
- St 37.0 = 1.0254
- St 37.0 = 1.0254

#### **4.2 Fittings**

are assembled from parts acc. to :

|                            |                    |
|----------------------------|--------------------|
| ASME / ANSI B16.28 / B16.9 | for elbows         |
| ASME / ANSI B16.9          | for tees, reducers |
| DIN 2605 / 2606, Teil 1    | for elbows         |
| DIN 2615, Teil 1           | for tees           |
| DIN 2616, Teil 1           | for reducers       |

or welded from steel pipe. Some of the parts are also machined; for these, the materials are RSt 37-2 or H II.

#### **4.3 Flanges Variants :**

according to ASME / ANSI B16.5 :

- slip on welding
- lap joint (with collar or stub end)
- lap joint (with lap formed by metal flaring process)
- welding neck

The used materials are :

- ASTM A-105
- ASTM A-350 Gr. LF 2
- as well as
- RSt 37-2 / 1.0038
- H II / 1.0425
- C 22.8 / 1.0460

#### **4.4 Screws and Nuts**

The quality of screws / nuts being used in the case of assembled parts that are screwed together in the plant corresponds to DIN 267.

For screws applies strength class 4.6 respectively 5.6 in steel as well as A2 respectively A4 in alloy steel.

For nuts applies strength class 5 in steel as well as A2 respectively A4 in alloy steel.  
Hexagon socket head screws DIN 912 are only available in class 8.8, 12.9 or A4.

Stud bolts DIN 938 will be offered in class 5.8 or A2.

#### **4.5 Options**

Earthing studs allow the external earthing of the pipe system and are available on Value Series and on Select series. The studs are welded in the middle of the steel fitting or spool with a length of less than 500mm. For longer spools or fittings the stud is welded at 150 mm behind the flange. The material used for earthing studs is stainless steel. The dimensions of the studs are a M6 thread 25mm long.

Vent extenders allow the venting system to perform through the insulation. With vent extenders it is also possible to collect the permeant. Vent extenders are available on Value Series and on Select Series. The vent extenders are welded in the middle of the steel fitting or spool with a length of less than 500mm. For longer spools or fittings the vent extender is welded at 150 mm behind the flange. The standard vent extender has a 1/8 NPT thread.

Conductive or antistatic PTFE liner has a black carbon additive that allows for the dissipation of static electricity through the PTFE liner to the metal pipe or fitting wall. Conductive liner is available in the Select Series only. Conductive liner thickness are 6% - 8% less than for non-conductive liner. The physical values of conductive liner are approximately 20% lower than for non conductive liner.

## **4. Pipe, Fittings and Flanges**

The tolerances of the lined products observe the specification of ASME / ANSI B16.5. Further details are contained in the single information sheets

## 5. Tolerances

The marking of the products is permanent. It is made according to ANSI B16.5. Special requests are possible.

## 6. Marking

With the exception of some red.-flanges, blind-flanges and the solid PTFE parts, all lined pipe and fittings are provided with vent holes. These have diameters mostly from 3 to 4 mm. They serve to inspect after production as well as to indicate leaks when working.

Depending on service conditions vent hole extensions with an internal thread could be welded on. This opens the possibility to either compensate for insulation, suck off permeation or to close them by screws to avoid environmental pollution. If vent hole extensions will be used, one per part is sufficient.

We recommend to keep the vent holes always open. Closed vent holes may cause collapsing of liners, due to permeated gas between lining and housing.

## 7. Vent Holes

Metal surfaces on the outside of flanged pipe parts are subjected to steel shot blasting SA 2.5 and treated with zinc rich epoxy primer.

Multilayer coatings tend to cracking while fixed at site; we do not recommend them.

## 8. Protective Coating

All assemblies have their flared gasket faces covered with end plates secured by either clips or metal bolts. This serves to protect the lining, to keep the flared face down as well as to maintain the interior clean. Parts with injected plastic (PFA) or isostatically pressed PTFE-gasket faces can be protected by plastic caps.

## 9. Flange Protectors

The final inspection of the finished products occurs in several ways. First of all by visual control as to clean and good surfaces and subsequently by dimensional control of length, flange face, threads, check of marking etc. Finally a pressure and tightness test according to the shape and dimension is carried out. 100% of all parts are checked at room temperature as follows :

- straight pipe =  $14 \times 10^5$  Pa hydraulically or pneumatically
- elbows =  $14 \times 10^5$  Pa and 35 kV DC
- tees, crosses, instrument tees =  $14 \times 10^5$  Pa and 35 kV DC
- chemical transfer hoses = 1,5 x nominal pressure
- industrial hoses = 1,5 x working pressure
- others = 35 kV DC or according to agreements

## 10. Final Inspection

Pressure tests according to ASTM F-423 and F-781 (elevated pressure) are only carried out by agreement.

Special checks in warm water bath with outside pressure or vacuum checks under raised temperatures are possible.

## 11.1 General

At the passage of media through pipe parts or flexible hoses static electric charges may form. In order to avoid these charges that may lead to spark formation and possibly to the ignition of gas-air mixtures, the PTFE-lining must allow electrical discharge. RESISTOFLEX GMBH produces upon special request lined pipe parts or fittings and flexible hoses that allow flow of static electricity.

## 11. Surface resistivity on PTFE-Linings

### 11.2 Values

The values refer only to PTFE powders that are adjusted to be electrically conductive. They apply both to the inside and outside surface and to the passage through the PTFE wall. As soon as the lining comes into contact with the armoured parts, i.e. pipe, hose, etc., flow of the charge through these occurs; this discharge takes place through metal parts and is therefore smaller than  $10^6$  Ohm.

RESISTOFLEX GmbH produces PTFE linings having surface resistivities in the range between  $10^4$  and  $10^8$  Ohm. This is according to the "Directions to avoid ignition danger as a result of electrostatic charges" of the trade associations, committee of experts for chemistry, ZH 1/200.

Measuring is being carried out according to DIN 53 482 and / or ASTM D257. The following definitions apply :

#### 1. "Volume resistivity"

$R_A = 1 \times 10^6$  bis  $5 \times 10^8$  ( $\Omega \times \text{cm}^2$ ) referred to an electrode surface of diameter 24,2 or diameter 49,5 mm according to 5 or  $20 \text{ cm}^2$ .

#### 2. "Volume resistance "

$R_D$  in ( $\Omega$ ) that is multiplied by the electrode surface .

$R_D = 1 \times 10^6$  bis  $1 \times 10^8$  ( $\Omega$ )

#### 3. "surface resistance" $R_O$ is being measured. It gives information on the insulation condition on the surface of a material.

$R_O = 1 \times 10^6$  bis  $5 \times 10^8$  ( $\Omega$ )

### 11.3 Volume and surface resistivities

The Volume and surface resistivities acc. to DIN 53 428 are within  $10^4$  and  $10^6$  Ohm for PTFE - granular resin and within  $10^6$  and  $10^8$  Ohm for PTFE - fine powder resin, depending on the kind of product.

Electrically conductive PTFE - linings normally yield wallthicknesses which are 6 % to 8 % thinner than white ones.

The physical values are also reduced to a level of approx. 20 % below.

#### 11.4 We furthermore would like to inform you, that for some liquids it might occur, that it absorbs the carbon black off the PTFE and could be contaminated.

Lined products must not be welded, brazed or torch-cut since this may damage the lining.

For shipment all flanges are protected by covers to prevent damaging during transport and storage. These covers should only be removed shortly before installation. If dismantled for inspection they should be replaced immediately.

It is not necessary to use gaskets between the PTFE sealing faces. If, however, flares are connected to sealing faces of other materials, such as glass, ceramics, carbon, or metal, and where the flares may not be parallel, it is recommended that an additional PTFE gasket be employed. This gasket should be 5 mm thick. It can absorb unevenness.

Excessive bolt tightening during assembly can deform the sealing face. To avoid this, the following bolt torques should not be exceeded.

See table below for allowed torques.

### **12.1 Bolt torques**

Bolt torques of the flange screws to ANSI B16.5 for Class 150 and Class 300 are shown in the table below.

These torque values are valid for lightly oiled A 193 B7 bolts and A 194 2H nuts and evtl. washers. Corroded threads may increase the torque values ineffective or even double them.

Tighten the flange bolts with a torque wrench, using a "crisscross" pattern that alternately tightens the bolts located 180 ° apart. Using this pattern, tighten the bolts in 20 % increments of the final bolt torque until 80 % of the final bolt torque has been achieved. For tightening to the final torque values, tighten bolts sequently clockwise once around the flange. This will help ensure that the bolts are evenly stressed.

## **12. Installation and Maintenance Instructions for Lined Pipe, Fittings, Transfer Hoses and Expansion Joints**

| <b>Dimension</b> | <b>ANSI B16.5 Class 150</b> |                                      |  | <b>ANSI B16.5 Class 300</b> |                                      |  |
|------------------|-----------------------------|--------------------------------------|--|-----------------------------|--------------------------------------|--|
|                  | <b>NPS</b>                  | <b>no. of bolts<br/>x<br/>thread</b> | <b>bolt torque<br/>± 25 %<br/>ft - lbs</b> | <b>± 25 %<br/>Nm</b>        | <b>no. of bolts<br/>x<br/>thread</b> | <b>bolt torque<br/>± 25 %<br/>ft - lbs</b> |
| 1/2"             | 4 x 1/2"                    | 10 - 15                              | 14 - 21                                    | 4 x 1/2"                    | 12 - 18                              | 17 - 26                                    |
| 3/4"             | 4 x 1/2"                    | 10 - 15                              | 14 - 21                                    | 4 x 5/8"                    | 12 - 18                              | 17 - 26                                    |
| 1"               | 4 x 1/2"                    | 11 - 17                              | 15 - 23                                    | 4 x 5/8"                    | 13 - 20                              | 18 - 27                                    |
| 1 1/2"           | 4 x 1/2"                    | 25 - 38                              | 35 - 53                                    | 4 x 3/4"                    | 38 - 57                              | 53 - 80                                    |
| 2"               | 4 x 5/8"                    | 52 - 80                              | 73 - 110                                   | 8 x 5/8"                    | 26 - 40                              | 36 - 54                                    |
| 2 1/2"           | 4 x 5/8"                    | 68 - 105                             | 95 - 145                                   | 8 x 3/4"                    | 40 - 60                              | 56 - 84                                    |
| 3"               | 4 x 5/8"                    | 82 - 125                             | 115 - 173                                  | 8 x 3/4"                    | 50 - 75                              | 70 - 105                                   |
| 4"               | 8 x 5/8"                    | 55 - 83                              | 77 - 116                                   | 8 x 3/4"                    | 65 - 98                              | 91 - 137                                   |
| 5"               | 8 x 3/4"                    | 82 - 125                             | 115 - 173                                  | 8 x 3/4"                    | 96 - 145                             | 135 - 203                                  |
| 6"               | 8 x 3/4"                    | 100 - 150                            | 140 - 210                                  | 12 x 3/4"                   | 66 - 100                             | 93 - 140                                   |
| 8"               | 8 x 3/4"                    | 135 - 205                            | 190 - 285                                  | 12 x 7/8"                   | 105 - 158                            | 147 - 221                                  |
| 10"              | 12 x 7/8"                   | 125 - 190                            | 175 - 263                                  | 16 x 1"                     | 108 - 162                            | 152 - 228                                  |
| 12"              | 12 x 7/8"                   | 155 - 235                            | 217 - 326                                  | 16 x 1 1/8"                 | 145 - 218                            | 203 - 305                                  |
| 14"              | 12 x 1"                     | 152 - 230                            | 210 - 315                                  | 20 x 1 1/8"                 | 145 - 218                            | 203 - 305                                  |
| 16"              | 16 x 1"                     | 143 - 215                            | 198 - 300                                  | 20 x 1 1/4 "                | 192 - 290                            | 266 - 400                                  |
| 18"              | 16 x 1 1/8"                 | 210 - 315                            | 290 - 435                                  | 24 x 1 1/4"                 | 195 - 293                            | 273 - 410                                  |
| 20"              | 20 x 1 1/8"                 | 190 - 285                            | 262 - 395                                  | 24 x 1 1/4"                 | 220 - 330                            | 308 - 462                                  |
| 24"              | 20 x 1 1/4"                 | 221 - 335                            | 305 - 458                                  | 24 x 1 1/2"                 | 320 - 480                            | 448 - 672                                  |

A retorque should be applied a minimum of 24 hours after the initial torque or after the first thermal cycle. This allows for seating of the plastic and for relaxation of the bolts. If the system is to perform at elevated temperatures, it is recommended that hot water be circulated at the maximum operating temperature of the process if possible for a minimum of 24 h. This allows for the pipe system to experience one thermal cycle. After cool-down, retorquing of the system should be done. Torquing should only be done on the system in the ambient, cooled state, never while the process is at elevated temperature or excessive force could be applied to the plastic faces.

Retorque should be done annually thereafter especially if the process line experiences elevated temperatures or extreme ambient temperature situations. Frequency of retorque depends on application. Vibration, bolt strength or number of thermocycles are important. Continuous processes need less retorque. Cold flow of flare material is shown under 3.3 of this specification.

All lined products have small vent holes. It is important that these are not be blocked by insulation or plugged by paint as this may cause the lining to collapse. These vent holes also serve as early warning leakage indicators. The number of vent holes may be reduced if necessary. Those which remain could be provided with screwed couplings to either closed with nipples or connected to a vacuum pump.

To avoid damage to the sealing faces, pipes and fittings should only be dismantled below +40°C / +104°F.

If a flange connection leaks even though all bolts are tight, DO NOT TIGHTEN UP ANY MORE. Never exceed the above mentioned bolt torques.

Loosen the bolts opposite the leak and tighten up the other side. If leakage persists, the sealing faces should be inspected for grooves or chips. Grooves or nicks not deeper than approx. 15% of the flare thickness can be removed with fine-grained abrasive paper.

## 12.2 Maximum pressure ratings:

This chart indicates max. pressure ratings for PTFE lined carbon steel pipe and fittings as indicated in this catalogue.

|                | Temp. °C            | 40 °C      | 100 °C     | 150 °C     | 200 °C     | 250 °C     |
|----------------|---------------------|------------|------------|------------|------------|------------|
| ANSI Class 150 | Pressure bar / psig | 17,6 / 250 | 16,5 / 235 | 15,1 / 215 | 14 / 200   | 12 / 170   |
| ANSI Class 300 | Pressure bar / psig | 31,6 / 450 | 27,4 / 390 | 24,3 / 345 | 20,8 / 295 | 17,2 / 245 |

### 13.1 Permeation Ratings

Permeation on different kinds of fluoropolymer linings; comparison.

The test conditions are as follows:

- surface of samples = 50 cm<sup>2</sup>
- test medium = Helium
- test pressure Δp = 2 bar

| Material        | Thickness of Sample<br>mm | Temperature<br>°C / °F | Time of Test<br>h | Permeation<br>dm <sup>3</sup><br>m <sup>2</sup> x 24h x bar |
|-----------------|---------------------------|------------------------|-------------------|---|
| PFA - Film      | 2,3                       | 25 / 77                | 382               | ca. 5,3   |
|                 |                           | 85 / 185               | 84                | ca. 22  |
| PTFE - Ram      | 4                         | 25 / 77                | 382               | ca. 3,3   |
|                 |                           | 85 / 185               | 84                | ca. 30  |
| PTFE - Granulat | 4                         | 25 / 77                | 382               | 0,4 - 1,2   |
|                 |                           | 85 / 185               | 84                | 1,4 - 7   |
| PTFE - Paste    | 4                         | 25 / 77                | 382               | 0,3 - 1   |
|                 |                           | 85 / 185               | 84                | 1,5 - 5   |

### 13.2 Permeation, migration of molecules through the lining wall

Diffusion is a spontaneous transport of medium caused by thermodynamic forces to compensate for concentration differences. The media migrates in the direction of decreasing concentration.

Of practical importance is the permeation through finite wall thicknesses with measured values for judgement.

How now does the permeation of a molecule through a plastic wall happen and which are the most important parameters?

A molecule inside the tube wall exerts almost elastic vibrations against it. With it energy must be supplied to overcome the linkage forces in the plastic or to move through so-called free spaces (no voids). PTFE is a hypocrystalline substance and the so-called free spaces are to be found in the amorphous part. Crystalline zones are not penetrated.

A series of influences causes individually or together the permeated quantity. It is presumed that both from liquid media and from gases only the gases permeate. The moving forces with it are the concentration or the partial pressure. In the case of substance mixtures both single components and their interactives may migrate. Little molecules get easier through so-called free spaces than big ones. Chain molecules as well permeate easier than branched ones, since their cross-sectional area is smaller. A temperature increase supplies energy; this increases vibrations in the wall and in the media. Thus the activity of the molecules increases, the wall expands and possibly the amorphous part of the wall PTFE increases and as a result more molecules move quicker through.

We get into a limit area when a media has a similar or equal polarity as the lining. Then the liquid may partially dissolve in the wall; it is then spoken of a swelling. With it the space between the macromolecules of the wall increases, that is more and greater free spaces develop. All molecules move then quicker through the wall even if only one generates the swelling. The thicker the lining is, the smaller is the permeation.

High crystallinity reduces permeation. Greatest caution is anyhow advisable here, since as manufacturers we always aspire to an optimum between permeation and durability with regards to crackings in the PTFE; high crystallinity reduces flexibility and increases drastically the risk of fracture. FLUOROFLEX products always guarantee durability, low permeation values and operational reliability.

## 13. Permeation

In general PTFE is chemically inert. We therefore differentiate between chemical reaction and physical behaviour. That is why in the following we deal with the physical interaction between plastic and contacting media.

Submicroscopic little spaces between the polymer molecules make it for some substances, as e. g. water vapor, monomers etc., possible to diffuse into the PTFE. By this the spontaneous media transport caused by pressure and temperature is meant.

The medium moves in the direction of decreasing concentration.

Absorption means here that a liquid diffuses into the PTFE and that the quantity increases with increasing pressure and increasing temperature.

If a lined tubing part is subjected to cyclic pressure and temperature loads, so that the liquid entrapped in the plastic wall evaporates or condenses, then the resistance of the plastic may be reduced at several points. This originates bubbles that in the course of time develop into so-called blisters. The PTFE there suffers a locally limited delamination.

**FLUOROFLEX**-PTFE linings are brought into an optimal condition. Only raw material having on one hand a sufficient flexibility and on the other a relatively high share in crystalline PTFE are being used. The situation is additionally aggravated by the great operative temperature range of PTFE and the thermal fluctuation originating with it between operation and standstill. It is presumed that owing to the pressure drop vapour penetrates in the PTFE, and since there prevails a great temperature drop the vapour condenses in the wall. During cyclic operation, that is stop and restart, the entrapped condensation quantities are being expanded with rising temperature, their volume increases and the plastic is being locally laminated.

Depending on this condition the formation of bubbles or blistering proceeds. This anyhow leads not at all or only after a comparatively long time to the total failure or outage of parts, since blisters mostly lie in the inner third of the wall, that is maintained in its function as separation layer.

How can we reduce this phenomenon? Since mostly the process condition cannot be changed, an insulation of the tubing parts usually clearly improves the situation or even avoids these blisters completely, the insulation of the flange area or other metal suspensions being there particularly important. The insulation avoids the great temperature drop and thus the condensation that is later expansion.

A qualifying test for PTFE is therefore also the so-called vapour-cold water test according to ASTM F-423.

Papers treating this subject are:

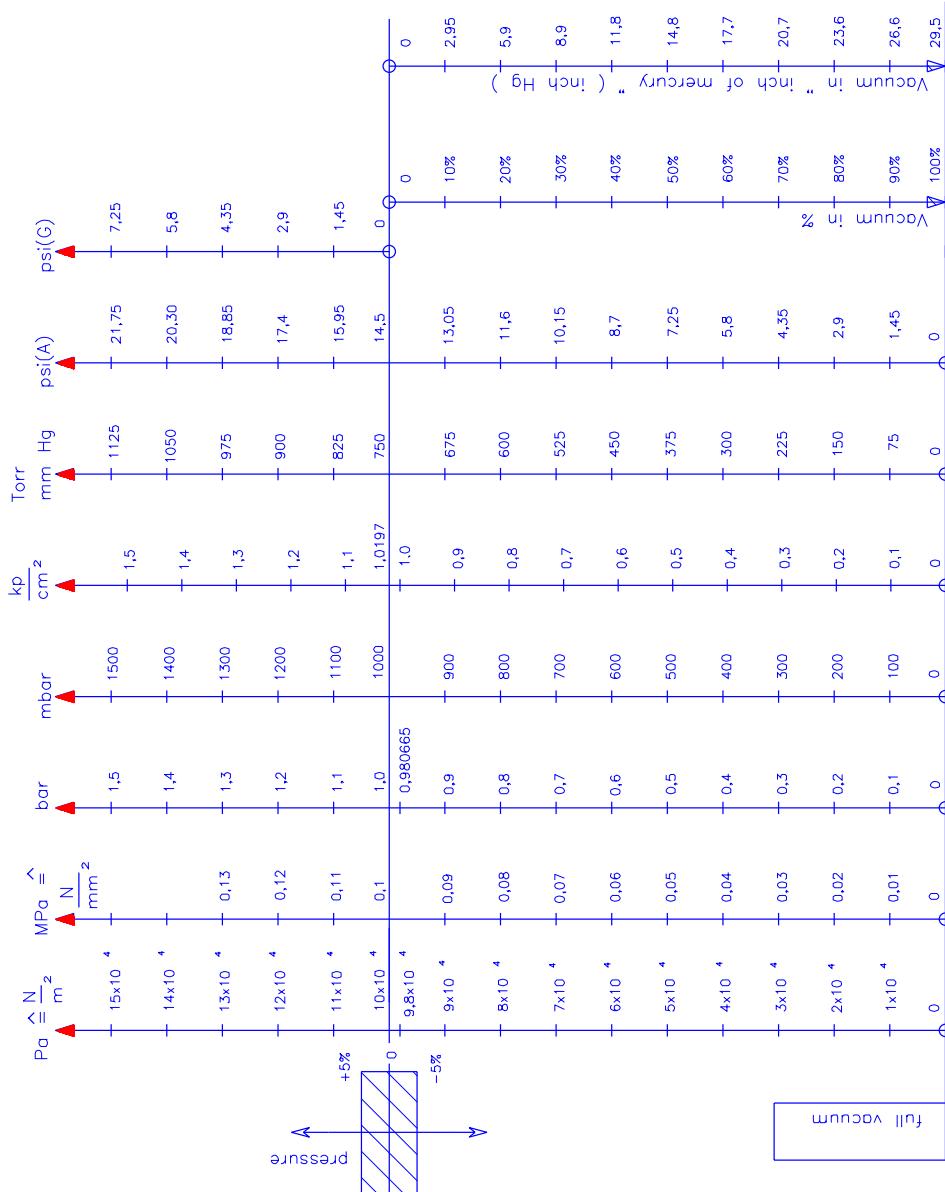
- Du Pont, reprint of the "Journal of Teflon" Nr. 125-D-2; A-62722-2.
- Du Pont, Teflon/Tefzel, protection against corrosion in chemistry H-11959-2.
- ASTM F-423
- NBS Voluntary Product Standard PS 33-70 des US Department of Commerce

All data shown in this catalogue according to our best knowledge but does not constitute any form of guarantee. Recommendations for use are only advisory. They do not release the user from his obligation to prior check the delivered products concerning their safety and readiness for use.

## **14. PTFE Absorption Behaviour in Chemical Application**

## **15. General Information**

## 16. Pressure Dimensions - compared between atmosph. Pressures and full Vacuum

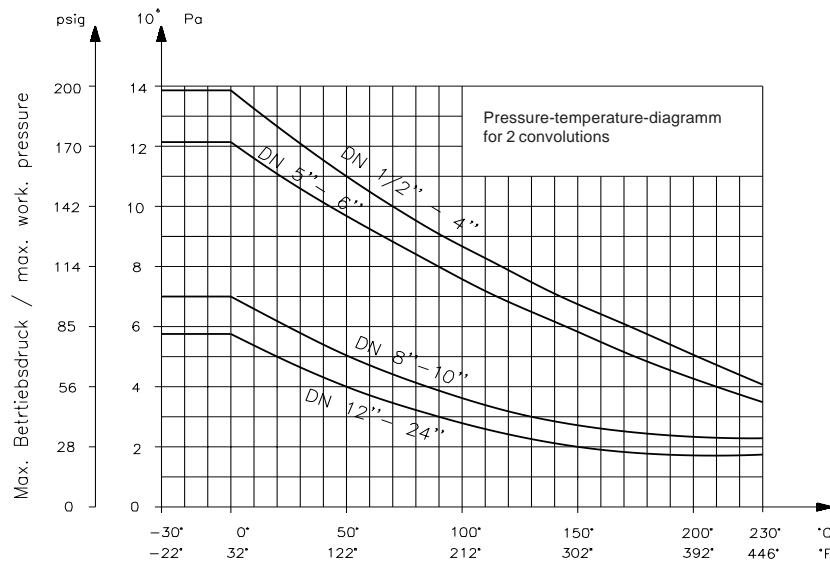


|                                   | PA<br>$\text{N/m}^2$ | MPa<br>$\text{MN/m}^2$ | bar                   | mbar                  | mm WS                 | mm WS                 | mm Hg<br>(Torr)      | psi                   | $\text{kp/cm}^2$<br>(at) |
|-----------------------------------|----------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|--------------------------|
| <b>1 Pa = 1 N/m<sup>2</sup></b>   | 1                    | $10^{-6}$              | $10^{-5}$             | $10^{-2}$             | $1,02 \times 10^{-4}$ | $1,02 \times 10^{-1}$ | $7,5 \times 10^{-3}$ | $1,45 \times 10^{-4}$ | $1,02 \times 10^{-5}$    |
| <b>1 MPa = 1 MN/m<sup>2</sup></b> | $10^6$               | 1                      | 10                    | $10^4$                | 102                   | $1,02 \times 10^5$    | 7500                 | 145                   | 10,2                     |
| <b>1 bar</b>                      | $10^5$               | $10^{-1}$              | 1                     | $10^3$                | 10,2                  | $1,02 \times 10^4$    | 750                  | 14,5                  | 1,02                     |
| <b>1 mbar</b>                     | $10^2$               | $10^{-4}$              | $10^{-3}$             | 1                     | $1,02 \times 10^{-2}$ | 10,2                  | $7,5 \times 10^{-1}$ | $1,45 \times 10^{-2}$ | $1,02 \times 10^{-3}$    |
| <b>1 mWS</b>                      | $9,81 \times 10^3$   | $9,81 \times 10^{-3}$  | $9,81 \times 10^{-2}$ | $9,81 \times 10^{-1}$ | 1                     | $10^3$                | $7,36 \times 10^1$   | 1,42                  | $10^{-1}$                |
| <b>1 mmWS</b>                     | 9,81                 | $9,81 \times 10^{-6}$  | $9,81 \times 10^{-5}$ | $9,81 \times 10^{-2}$ | $10^{-3}$             | 1                     | $7,5 \times 10^2$    | $1,42 \times 10^{-3}$ | $10^{-4}$                |
| <b>1 mmHg (Torr)</b>              | $1,33 \times 10^2$   | $1,33 \times 10^{-4}$  | $1,33 \times 10^{-3}$ | 1,33                  | $1,36 \times 10^{-2}$ | $1,36 \times 10^1$    | 1                    | $1,93 \times 10^{-2}$ | $1,36 \times 10^{-3}$    |
| <b>1 psi</b>                      | $6,89 \times 10^3$   | $6,89 \times 10^{-3}$  | $6,89 \times 10^2$    | $6,89 \times 10^1$    | $7,03 \times 10^{-1}$ | $7,03 \times 10^2$    | $5,17 \times 10^1$   | 1                     | $7,03 \times 10^{-2}$    |
| <b>1 kp/cm<sup>2</sup></b>        | $9,81 \times 10^4$   | $9,81 \times 10^{-2}$  | $9,81 \times 10^{-1}$ | $9,81 \times 10^2$    | $10^1$                | $10^4$                | $7,36 \times 10^2$   | $1,42 \times 10^1$    | 1                        |

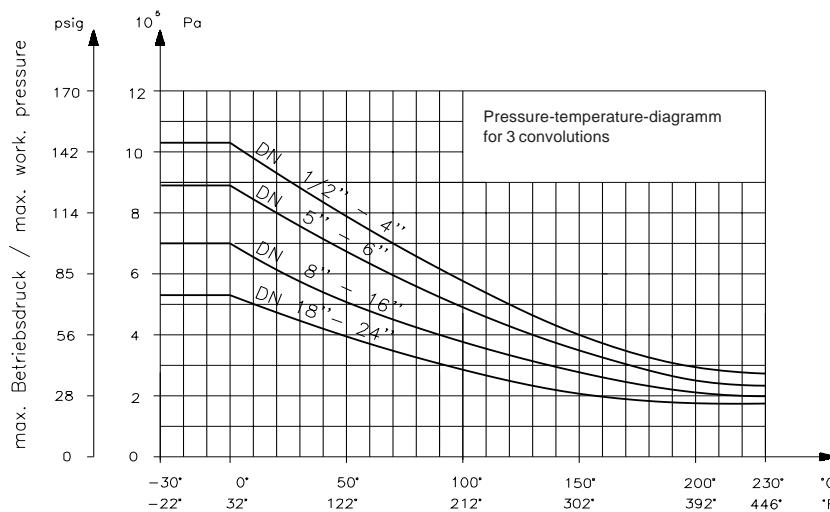
1  $\text{kp/cm}^2 = 9,80665 \text{ N/cm}^2 = 0,0980665 \text{ N/mm}^2$   
1  $\text{kp} = 9,80665 \text{ kg} \cdot \text{m/sec}^2 = 9,80665 \text{ N}$



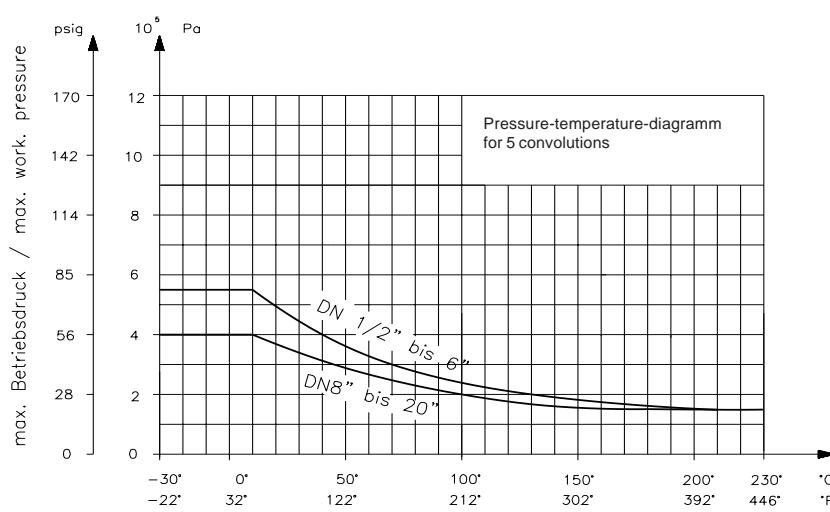
**Pressure-temperature-diagramms for PTFE-bellows with standard wall thickness**



**Bellow with  
2 convolutions**

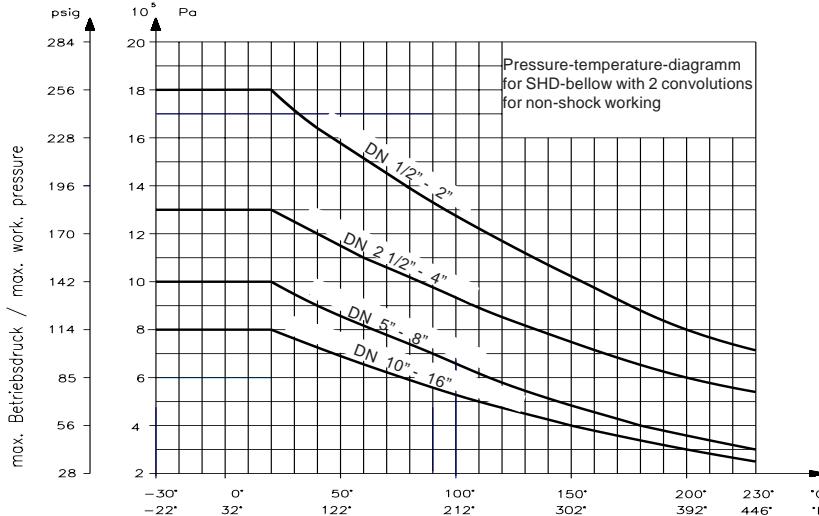


**Bellow with  
3 convolutions**

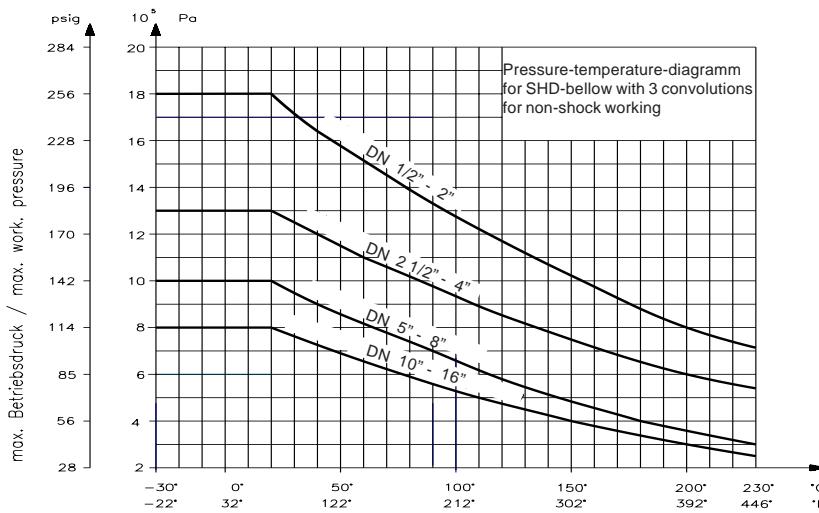


**Bellow with  
5 convolutions**

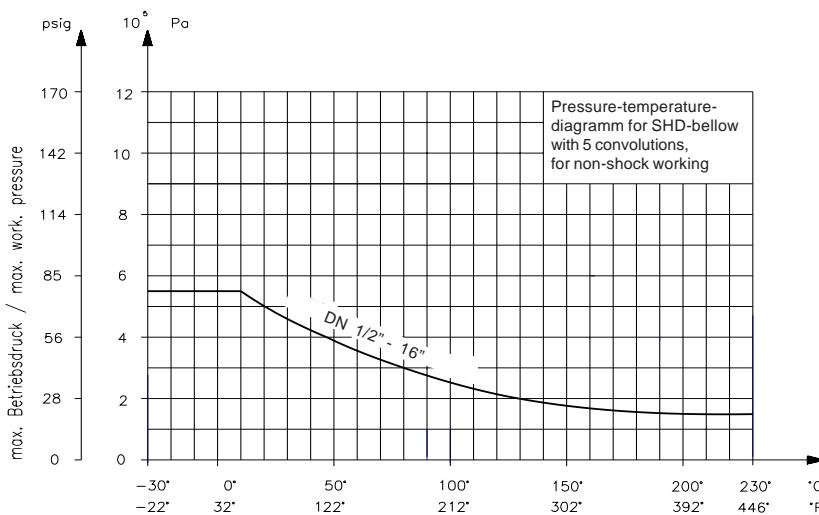
**Pressure-temperature-diagramms for PTFE-bellows with SHD wall thickness**



**Bellow with  
2 convolutions**



**Bellow with  
3 convolutions**



**Bellow with  
5 convolutions**

## PTFE-Expansion Joint 2 Convolutions

| DN    | axial travel max.<br>(± mm) | misalign-<br>ment max.<br>(mm) | eff. bellows<br>cross-<br>section<br>(cm <sup>2</sup> ) | vacuum resistance |               | inherent resistance        |                            |
|-------|-----------------------------|--------------------------------|---|-------------------|---------------|----------------------------|----------------------------|
|       |                             |                                |   | at<br>$10^4$ Pa   | at<br>max. °C | C<br>compress.<br>(N / mm) | W<br>extension<br>(N / mm) |
| 0.5"  | 5                           | 2                              | 10  | 0,1               | 200           | 26                         | 24                         |
| 0.75" | 6                           | 3                              | 10  | 0,1               | 200           | 26                         | 24                         |
| 1"    | 6                           | 3                              | 10  | 0,1               | 200           | 26                         | 24                         |
| 1.5"  | 6                           | 3                              | 19  | 0,1               | 200           | 81                         | 63                         |
| 2"    | 6                           | 3                              | 30  | 0,1               | 200           | 140                        | 90                         |
| 2.5"  | 9                           | 5                              | 45  | 0,1               | 200           | 159                        | 102                        |
| 3"    | 9                           | 5                              | 70  | 0,1               | 200           | 170                        | 120                        |
| 4"    | 13                          | 6                              | 112   | 0,1               | 200           | 194                        | 130                        |
| 5"    | 13                          | 6                              | 166   | 0,1               | 150           | 230                        | 138                        |
| 6"    | 13                          | 6                              | 245   | 0,1               | 150           | 263                        | 145                        |
| 8"    | 13                          | 6                              | 400   | 0,1               | 50            | 380                        | 157                        |
|       |                             |                                |   | 2                 | 150           |                            |                            |
| 10"   | 15                          | 6                              | 660   | 0,7               | 45            | 212                        | 156                        |
|       |                             |                                |   | 3,4               | 100           |                            |                            |
| 12"   | 20                          | 10                             | 770   | 1,5               | 45            | 200                        | 158                        |
|       |                             |                                |   | 6,7               | 100           |                            |                            |
| 14"   | 20                          | 10                             | 1260  | 1,5               | 45            | 251                        | 185                        |
|       |                             |                                |   | 6,7               | 100           |                            |                            |
| 16"   | 25                          | 10                             | 1500  | 1,5               | 45            | 260                        | 192                        |
|       |                             |                                |   | 6,7               | 100           |                            |                            |
| 18"   | 25                          | 10                             | 2000  | 3,4               | 45            | 385                        | 340                        |
|       |                             |                                |   | 7                 | 100           |                            |                            |
| 20"   | 25                          | 10                             | 2080  | 8                 | 100           | -                          | -                          |
| 24"   | 15                          | 10                             | 3200  | 8,7               | 100           | -                          | -                          |

Angular deflection approx. 7° max. Axial travel is based on installation without misalignment or angular deflection.

The burst pressure is approx. 4 times the max. working pressure shown on the diagramm.

The figures stated are average values and apply to room temperature. Deviations due to processing variations are possible.

For compression :

$$\text{Compression force } F_C = C \times S^{1/2}$$

where C from table

S = travel in mm

For extension:

$$\text{Expansion force } F_W = W \times S^{1/2}$$

where W from table

S = travel in mm

Flanges up to DN 400 have 2 limit bolts, DN 450, 500 and 600 have 3.

| DN    | axial travel max.<br>(± mm) | misalign-<br>ment max.<br>(mm) | eff. bellows<br>cross-<br>section<br>(cm <sup>2</sup> ) | vacuum resistance        |               | inherent resistance        |                            |
|-------|-----------------------------|--------------------------------|---|--------------------------|---------------|----------------------------|----------------------------|
|       |                             |                                |   | at<br>10 <sup>4</sup> Pa | at<br>max. °C | C<br>compress.<br>(N / mm) | W<br>extension<br>(N / mm) |
| 0.5"  | 10                          | 4                              | 10  | 0,1                      | 200           | 25                         | 21                         |
| 0.75" | 12                          | 5                              | 10  | 0,1                      | 200           | 25                         | 21                         |
| 1"    | 13                          | 6                              | 10  | 0,1                      | 200           | 25                         | 21                         |
| 1.5"  | 13                          | 6                              | 19  | 0,1                      | 200           | 63                         | 51                         |
| 2"    | 15                          | 9                              | 30  | 0,1                      | 200           | 81                         | 64                         |
| 2.5"  | 19                          | 9                              | 45  | 0,1                      | 200           | 124                        | 84                         |
| 3"    | 25                          | 13                             | 70  | 0,1                      | 200           | 155                        | 100                        |
| 4"    | 25                          | 13                             | 112   | 0,1                      | 200           | 175                        | 104                        |
| 5"    | 25                          | 14                             | 166   | 0,1                      | 150           | 197                        | 105                        |
| 6"    | 28                          | 14                             | 245   | 0,1                      | 150           | 220                        | 108                        |
| 8"    | 28                          | 14                             | 400   | 0,1                      | 50            | 264                        | 90                         |
|       |                             |                                |   | 2                        | 150           |                            |                            |
| 10"   | 30                          | 14                             | 660   | 0,7                      | 45            | 190                        | 93                         |
|       |                             |                                |   | 3,4                      | 100           |                            |                            |
| 12"   | 30                          | 15                             | 770   | 1,5                      | 45            | 180                        | 95                         |
|       |                             |                                |   | 6,7                      | 100           |                            |                            |
| 14"   | 32                          | 18                             | 1260  | 1,5                      | 45            | 237                        | 110                        |
|       |                             |                                |   | 6,7                      | 100           |                            |                            |
| 16"   | 35                          | 20                             | 1500  | 1,5                      | 45            | 254                        | 100                        |
|       |                             |                                |   | 6,7                      | 100           |                            |                            |
| 18"   | 30                          | 20                             | 2000  | 3,4                      | 45            | -                          | -                          |
|       |                             |                                |   | 7                        | 100           |                            |                            |
| 20"   | 30                          | 25                             | 2080  | 8                        | 100           | -                          | -                          |
| 24"   | 25                          | 20                             | 3200  | 8,7                      | 100           | -                          | -                          |

## PTFE-Expansion Joint 3 Convolutes

Angular deflection approx. 14° max. Axial travel is based on installation without misalignment or angular deflection.

The burst pressure is approx. 4 times the max. working pressure shown on the diagramm.

The figures stated are average values and apply to room temperature. Deviations due to processing variations are possible.

For compression :

$$\text{Compression force } F_C = C \times S^{1/2}$$

where C from table

S = travel in mm

For extension:

$$\text{Expansion force } F_W = W \times S^{1/2}$$

where W from table

S = travel in mm

Flanges up to DN 400 have 2 limit bolts, DN 450, 500 and 600 have 3.

## PTFE-Expansion Joint 5 Convolutions

| DN    | axial travel max.<br>(± mm) | misalign-<br>ment max.<br>(mm) | eff. bellows cross-<br>section<br>(cm <sup>2</sup> ) | inherent resistance        |                            |
|-------|-----------------------------|--------------------------------|--|----------------------------|----------------------------|
|       |                             |                                |  | C<br>compress.<br>(N / mm) | W<br>extension<br>(N / mm) |
| 0.5"  | 10                          | 8                              | 10   | 23                         | 20                         |
| 0.75" | 12                          | 10                             | 10   | 23                         | 20                         |
| 1"    | 13                          | 12                             | 10   | 23                         | 20                         |
| 1.5"  | 19                          | 12                             | 19   | 55                         | 40                         |
| 2"    | 25                          | 12                             | 30   | 97                         | 43                         |
| 2.5"  | 25                          | 13                             | 45   | 102                        | 56                         |
| 3"    | 25                          | 16                             | 70   | 114                        | 62                         |
| 4"    | 32                          | 16                             | 112  | 127                        | 67                         |
| 5"    | 32                          | 16                             | 166  | 139                        | 68                         |
| 6"    | 32                          | 16                             | 245  | 150                        | 68                         |
| 8"    | 32                          | 16                             | 400  | 177                        | 68                         |
| 10"   | 32                          | 16                             | 660  | 150                        | 68                         |
| 12"   | 35                          | 18                             | 770  | 155                        | 78                         |
| 14"   | 35                          | 18                             | 1260   | 210                        | 65                         |
| 16"   | 40                          | 25                             | 1500   | 200                        | 67                         |
| 20"   | 40                          | 25                             | 2080   | 205                        | 65                         |

Calculation of the forces for:

Compression of the bellow:

$$\text{force } F_c = C \times S^{1/2}$$

with C from table

S = travel in mm.

Extension of the bellow:

$$\text{force } F_w = W \times S^{1/2}$$

with W from table

S = travel in mm.

Please notice:

- Curves and chart are only valid at neutral length and with limit bolts in place.
- The max. angular deflection is approx. 20°.
- Above mentioned travel, misalignment or angular deflectio are alternatives, i.e. the percentage values are not allowed to exceed 100 % when added together.
- Burst pressure is minimum 4x the indicated in the chart. Compared with the pressure curves of the 2- and 3-convolute bellows, it is here much lower because of the risk of buckling.
- The figures stated are average values and apply to room temperature. Deviations due to processing variations are possible.
- For abrasive applications the bellows (on request) can be equipped with a PTFE-nozzle liner, flared on one side. Movements are then restricted.

Safety instructions:

- Follow install. instructions.
- Do not exceed pressure / temperature rating shown in the appropriate bellows chart.
- Safeguard the units in hazardous service.
- Leave limit bolts in. Severe damage can result if they are removed or altered.
- Remove the flange covers only when ready to install the bellow
- Insure that sealing faces are clean, smooth and parallel.
- While installing the flanges, make sure the bolts do not jut out from the flange backside to the bellow.
- Improperly installation or beyond the pressure / temperature rating may result in property damage or personal injury.

| DN    | axial travel max.<br>(± mm) | misalign-<br>ment max.<br>(mm) | eff. bellows<br>cross-<br>section<br>(cm <sup>2</sup> ) | inherent resistance        |                            |
|-------|-----------------------------|--------------------------------|---|----------------------------|----------------------------|
|       |                             |                                |   | C<br>compress.<br>(N / mm) | W<br>extension<br>(N / mm) |
| 0.5"  | 6                           | 2                              | 10  | 180                        | 141                        |
| 0.75" | 6                           | 2                              | 10  | 180                        | 141                        |
| 1"    | 6                           | 2,5                            | 10  | 180                        | 141                        |
| 1.5"  | 8                           | 3                              | 19  | 200                        | 113                        |
| 2"    | 9                           | 4                              | 30  | 260                        | 160                        |
| 2.5"  | 9                           | 4,5                            | 45  | 111                        | 144                        |
| 3"    | 10                          | 5,5                            | 70  | 266                        | 300                        |
| 4"    | 13                          | 6                              | 112   | 209                        | 188                        |
| 5"    | 16                          | 7                              | 166   | 121                        | 132                        |
| 6"    | 16                          | 8                              | 245   | 277                        | 234                        |
| 8"    | 18                          | 8                              | 400   | 299                        | 218                        |
| 10"   | 20                          | 8                              | 660   | 174                        | 248                        |
| 12"   | 20                          | 9                              | 770   | 300                        | 251                        |
| 14"   | 22                          | 9                              | 1260  | 124                        | 377                        |
| 16"   | 24                          | 10                             | 1500  | 638                        | 563                        |

## PTFE-SHD- Expansion Joint 2 convolutions

| vacuum data |                                       |             |             |             |             |
|-------------|---------------------------------------|-------------|-------------|-------------|-------------|
|             | max. temperature (°F) for full vacuum |             |             |             |             |
| DN          | 0.5" - 2"                             | 2.5" - 3"   | 4" - 5"     | 6" - 8"     | 10" - 16"   |
| °C / °F     | 230° / 480°                           | 230° / 480° | 230° / 480° | 200° / 390° | 175° / 350° |

For compression forces:

$$\text{Compression force } F_c = C \times S^{1/2}$$

with C from table, S = travel in mm.

For extension forces:

$$\text{Extension force } F_w = W \times S^{1/2}$$

with W from table, S = travel in mm.

Please notice:

- Curves and chart are only valid at neutral length and with limit bolts in place.
- The max. angular deflection is approx. 5°.
- Above mentioned travel, misalignment or angular deflection are alternatives, i.e. the percentage values are not allowed to exceed 100 % when added together.
- Burst pressure is about 4x the indicated in the chart.
- The figures stated are average values and apply to room temperature. Deviations due to processing variations are possible.
- For abrasive applications the bellows (on request) can be equipped with a PTFE-nozzle liner, flared on one side. Movements are then restricted.

Safety instructions:

- Follow install. instructions.
- Do not exceed pressure / temperature rating shown in the appropriate bellows chart.
- Safeguard the units in hazardous service.
- Leave limit bolts in. Severe damage can result if they are removed or altered.
- Remove the flange covers only when ready to install the bellow
- Insure that sealing faces are clean, smooth and parallel.
- While installing the flanges, make sure the bolts do not jut out from the flange backside to the bellow.
- Improper installation or beyond the pressure / temperature rating may result in property damage or personal injury.

| DN    | axial travel max.<br>(± mm) | misalign-<br>ment<br>max.<br>(mm) | eff. bellows<br>cross-<br>section<br>(cm <sup>2</sup> ) | inherent resistance        |                            |
|-------|-----------------------------|-----------------------------------|---|----------------------------|----------------------------|
|       |                             |                                   |   | C<br>compress.<br>(N / mm) | W<br>extension<br>(N / mm) |
| 0.5"  | 9                           | 3                                 | 10  | 120                        | 94                         |
| 0.75" | 9                           | 4                                 | 10  | 120                        | 94                         |
| 1"    | 9                           | 4                                 | 10  | 120                        | 94                         |
| 1.5"  | 13                          | 6                                 | 19  | 133                        | 75                         |
| 2"    | 15                          | 8                                 | 30  | 173                        | 104                        |
| 2.5"  | 15                          | 9                                 | 45  | 74                         | 96                         |
| 3"    | 16                          | 10                                | 70  | 178                        | 200                        |
| 4"    | 20                          | 12                                | 112   | 140                        | 125                        |
| 5"    | 25                          | 13                                | 166   | 80,5                       | 88                         |
| 6"    | 25                          | 14                                | 245   | 185                        | 156                        |
| 8"    | 28                          | 14                                | 400   | 200                        | 145                        |
| 10"   | 30                          | 14                                | 660   | 116                        | 165                        |
| 12"   | 30                          | 15                                | 770   | 200                        | 167,3                      |
| 14"   | 35                          | 15                                | 1260  | 129                        | 327                        |
| 16"   | 35                          | 15                                | 1500  | 425                        | 375                        |

## PTFE-SHD- Expansion Joint 3 convolutions

| vacuum data |                                       |             |             |             |             |
|-------------|---------------------------------------|-------------|-------------|-------------|-------------|
|             | max. temperature (°F) for full vacuum |             |             |             |             |
| DN          | 0.5" - 2"                             | 2.5" - 3"   | 4" - 5"     | 6" - 8"     | 10" - 16"   |
| °C / °F     | 230° / 480°                           | 230° / 480° | 230° / 480° | 200° / 390° | 175° / 350° |

For compression forces:

$$\text{Compression force } F_c = C \times S^{1/2}$$

with C from table, S = travel in mm.

For extension forces:

$$\text{Extension force } F_w = W \times S^{1/2}$$

with W from table, S = travel in mm.

Please notice:

- Above shown curves and chart are only valid at neutral length and with limit bolts in place.
- The max. angular deflection is approx. 10°.
- Above mentioned travel, misalignment or angular deflection are alternatives, i.e. the percentage values are not allowed to exceed 100 % when added together.
- Burst pressure is about 4x the indicated in the chart.
- The figures stated are average values and apply to room temperature. Deviations due to processing variations are possible.
- For abrasive applications the bellows (on request) can be equipped with a PTFE-nozzle liner, flared on one side. Movements are then restricted.

Safety instructions:

- Follow install. instructions.
- Do not exceed pressure / temperature rating shown in the appropriate bellows chart.
- Safeguard the units in hazardous service.
- Leave limit bolts in. Severe damage can result if they are removed or altered.
- Remove the flange covers only when ready to install the bellow
- Insure that sealing faces are clean, smooth and parallel.
- While installing the flanges, make sure the bolts do not jut out from the flange backside to the bellow.
- Improper installation or beyond the pressure / temperature rating may result in property damage or personal injury.

| DN    | axial travel max.<br>(± mm) | misalign-<br>ment max.<br>(mm) | eff. bellows<br>cross-<br>section<br>(cm <sup>2</sup> ) | inherent resistance        |                            |
|-------|-----------------------------|--------------------------------|---|----------------------------|----------------------------|
|       |                             |                                |   | C<br>compress.<br>(N / mm) | W<br>extension<br>(N / mm) |
| 0.5"  | 12                          | 5                              | 10  | 48                         | 38                         |
| 0.75" | 12                          | 5                              | 10  | 48                         | 38                         |
| 1"    | 12                          | 8                              | 10  | 48                         | 38                         |
| 1.5"  | 18                          | 8                              | 19  | 53                         | 30                         |
| 2"    | 22                          | 10                             | 30  | 69                         | 43                         |
| 2.5"  | 22                          | 10                             | 45  | 30                         | 38                         |
| 3"    | 23                          | 14                             | 70  | 71                         | 80                         |
| 4"    | 29                          | 14                             | 112   | 56                         | 50                         |
| 5"    | 35                          | 14                             | 166   | 32                         | 35                         |
| 6"    | 35                          | 14                             | 245   | 74                         | 62                         |
| 8"    | 40                          | 15                             | 400   | 80                         | 58                         |
| 10"   | 42                          | 15                             | 660   | 46                         | 66                         |
| 12"   | 42                          | 16                             | 770   | 80                         | 67                         |
| 14"   | 43                          | 17                             | 1260  | 101                        | 126                        |
| 16"   | 45                          | 18                             | 1500  | 170                        | 150                        |

## PTFE-SHD- Expansion Joint 5 convolutions

For compression forces:

$$\text{Compression force } F_c = C \times S^{1/2}$$

with C from table, S = travel in mm.

For extension forces:

$$\text{Extension force } F_w = W \times S^{1/2}$$

with W from table, S = travel in mm.

Please notice:

- Above shown curves and chart are only valid at neutral length and with limit bolts in place.
- The max. angular deflection is approx. 15°.
- Above mentioned travel, misalignment or angular deflection are alternatives, i.e. the percentage values are not allowed to exceed 100 % when added together.
- Burst pressure is about 4x the indicated in the chart. Compared with the pressure curves of the 2- and 3-convolute bellows, it is here much lower because of the risk of buckling.
- The figures stated are average values and apply to room temperature. Deviations due to processing variations are possible.
- For abrasive applications the bellows (on request) can be equipped with a PTFE-nozzle liner, flared on one side. Movements are then restricted.

Savety instructions:

- Follow install. instructions.
- Do not exceed pressure / temperature rating shown in the appropriate bellows chart.
- Safeguard the units in hazardous service.
- Leave limit bolts in. Severe damage can result if they are removed or altered.
- Remove the flange covers only when ready to install the bellow
- Insure that sealing faces are clean, smooth and parallel.
- While installing the flanges, make sure the bolts do not jut out from the flange backside to the bellow.
- Improperly installation or beyond the pressure / temperature rating may result in property damage or personal injury.

**PTFE-Expansion-Joint  
with SS Housing &  
Spacer Bead**

| DN   | axial movement<br>$n = 1000$ | lateral movement         | angular movement  | torsion     | eff. bellow cross-section | spring rate<br>axial | spring rate<br>lateral | spring rate<br>angular | torsional stress | vacuum service       |                        |
|------|------------------------------|--------------------------|-------------------|-------------|---------------------------|----------------------|------------------------|------------------------|------------------|----------------------|------------------------|
|      | $\delta$<br>( $\pm$ mm)      | $\lambda$<br>( $\pm$ mm) | $\alpha$<br>(grd) | Mt<br>(kNm) | A<br>(cm <sup>2</sup> )   | c $\delta$<br>(N/mm) | c $\lambda$<br>(N/mm)  | c $\alpha$<br>(Nm/grd) | cT<br>(kNm/grd)  | at<br>72 °F<br>23 °C | at<br>320 °F<br>160 °C |
| 1,25 | 4,5                          | 2,3                      | 20                | -           | 20                        | 260                  | 106                    | 1,3                    | 0,2              | 0,15                 | 0,3                    |
|      | 9                            | 9,5                      | 31                | -           | 20                        | 130                  | 14                     | 0,7                    | 0,1              | 0,15                 | 0,3                    |
| 1,5  | 5,5                          | 2,6                      | 19                | 0,1         | 30,6                      | 272                  | 133                    | 2,1                    | 0,3              | 0,15                 | 0,3                    |
|      | 11                           | 10,5                     | 31                | 0,1         | 30,6                      | 136                  | 16                     | 1                      | 0,1              | 0,15                 | 0,3                    |
| 2"   | 6,5                          | 2,8                      | 19                | 0,1         | 44,7                      | 276                  | 157                    | 3,1                    | 0,5              | 0,15                 | 0,3                    |
|      | 13,5                         | 13                       | 33                | 0,2         | 44,3                      | 195                  | 23                     | 2,2                    | 0,4              | 0,15                 | 0,3                    |
| 2,5" | 8,5                          | 3                        | 20                | 0,2         | 67,1                      | 234                  | 203                    | 4                      | 1,1              | 0,15                 | 0,3                    |
|      | 16                           | 12                       | 29                | 0,3         | 67,4                      | 173                  | 34                     | 3                      | 0,8              | 0,15                 | 0,3                    |
| 3"   | 10                           | 3,2                      | 20                | 0,3         | 87,3                      | 220                  | 229                    | 5                      | 1,6              | 0,15                 | 0,3                    |
|      | 17,5                         | 11                       | 30                | 0,4         | 87,6                      | 178                  | 53                     | 4,1                    | 1,3              | 0,15                 | 0,3                    |
| 4"   | 10                           | 2,3                      | 16                | 0,7         | 135                       | 365                  | 769                    | 13                     | 5,6              | 0,15                 | 0,3                    |
|      | 20                           | 9                        | 28                | 0,7         | 135                       | 183                  | 96                     | 6,5                    | 2,8              | 0,15                 | 0,3                    |
| 5"   | 14,5                         | 3,9                      | 20                | 0,9         | 179,3                     | 290                  | 446                    | 14                     | 6,9              | 0,25                 | 0,4                    |
|      | 25                           | 14,5                     | 30                | 1,9         | 180,7                     | 290                  | 95                     | 14                     | 6,6              | 0,25                 | 0,4                    |
| 6"   | 15                           | 3,9                      | 17                | 2,8         | 260,7                     | 560                  | 912                    | 39                     | 22               | 0,25                 | 0,4                    |
|      | 30                           | 15,5                     | 30                | 2,8         | 260,7                     | 280                  | 117                    | 20                     | 11               | 0,25                 | 0,4                    |
| 8"   | 21                           | 4,2                      | 19                | 4,1         | 431,9                     | 412                  | 1123                   | 48                     | 40               | 0,35                 | 0,5                    |
|      | 39                           | 17,5                     | 30                | 6,5         | 434,1                     | 335                  | 191                    | 40                     | 31               | 0,35                 | 0,5                    |
| 10"  | 22                           | 3                        | 16                | 6,5         | 666                       | 525                  | 3024                   | 95                     | 111              | 0,4                  | 0,6                    |
|      | 40                           | 12,5                     | 25                | 7,8         | 667,4                     | 269                  | 308                    | 49                     | 41               | 0,4                  | 0,6                    |
| 12"  | 27                           | 4,4                      | 17                | 9,2         | 932,1                     | 480                  | 2037                   | 121                    | 108              | 0,5                  | 0,75                   |
|      | 47                           | 14                       | 25                | 12          | 932,1                     | 352                  | 436                    | 89                     | 80               | 0,5                  | 0,75                   |
| 14"  | 30                           | 4,5                      | 17                | 11          | 1119,2                    | 460                  | 2205                   | 139                    | 140              | 0,5                  | 0,75                   |
|      | 46                           | 11,5                     | 23                | 15          | 1119,2                    | 378                  | 672                    | 115                    | 116              | 0,5                  | 0,75                   |
| 16"  | 26                           | 2,9                      | 13                | 20          | 1448,8                    | 713                  | 6211                   | 281                    | 333              | 0,7                  | 0,9                    |
|      | 52                           | 11,5                     | 22                | 20          | 1448,8                    | 357                  | 779                    | 141                    | 167              | 0,7                  | 0,9                    |
| 18"  | 35                           | 4,5                      | 15                | 25          | 1820,9                    | 548                  | 3643                   | 272                    | 376              | 0,7                  | 0,9                    |
|      | 65                           | 17,5                     | 24                | 38          | 1813,3                    | 430                  | 645                    | 214                    | 284              | 0,7                  | 0,9                    |
| 20"  | 28                           | 2,8                      | 12                | 47          | 2235,4                    | 955                  | 10492                  | 586                    | 943              | 1                    | 1                      |
|      | 63                           | 14,5                     | 22                | 47          | 2235,4                    | 425                  | 923                    | 261                    | 419              | 1                    | 1                      |
| 24"  | 35                           | 3,4                      | 12                | 48          | 3200,9                    | 548                  | 6482                   | 484                    | 920              | 1                    | 1                      |
|      | 63                           | 11                       | 17                | 48          | 3200,9                    | 305                  | 1112                   | 269                    | 511              | 1                    | 1                      |

Reduction factors for application pressure, temperature related, acc. to flange material 1E1:

| temperature    | °C   | 20  | 100 | 150 | 200 | 230 |
|----------------|------|-----|-----|-----|-----|-----|
|                | °F   | 68  | 212 | 302 | 392 | 450 |
| appl. pressure | bar  | 10  | 8   | 7,5 | 6,9 | 6,2 |
|                | psig | 142 | 114 | 107 | 98  | 88  |

Flange material to select according to service temperature.

**PTFE-Expansion-Joint  
with SS Housing &  
Spacer Bead  
Flanges ANSI CL300**

| DN   | axial movement n = 1000 | lateral movement | angular movement | torsion | eff. bellow cross-section | spring rate axial | spring rate lateral | spring rate angular | torsional stress | vacuum service    |                      |
|------|-------------------------|------------------|------------------|---------|---------------------------|-------------------|---------------------|---------------------|------------------|-------------------|----------------------|
|      |                         |                  |                  |         |                           |                   |                     |                     |                  | c $\delta$ (N/mm) | A (cm <sup>2</sup> ) |
| 1.25 | 4                       | 2,1              | 17               | 0,1     | 19,7                      | 428               | 179                 | 2,2                 | 0,2              | 0,15              | 0,3                  |
|      | 7,5                     | 7                | 24               | 0,1     | 19,7                      | 238               | 30                  | 1,2                 | 0,1              | 0,15              | 0,3                  |
| 1.5  | 5                       | 2,5              | 17               | 0,1     | 30,8                      | 428               | 187                 | 3,3                 | 0,4              | 0,15              | 0,3                  |
|      | 8,5                     | 9                | 22               | 0,2     | 30,5                      | 354               | 34                  | 2,7                 | 0,3              | 0,15              | 0,3                  |
| 2"   | 7,5                     | 3,9              | 19               | 0,2     | 44,3                      | 357               | 141                 | 4                   | 0,7              | 0,15              | 0,3                  |
|      | 12                      | 12               | 25               | 0,3     | 44,2                      | 390               | 43                  | 4,5                 | 0,6              | 0,15              | 0,3                  |
| 2,5" | 7                       | 2,7              | 16               | 0,5     | 67,2                      | 660               | 499                 | 12                  | 2,6              | 0,15              | 0,3                  |
|      | 13                      | 9                | 23               | 0,5     | 67,2                      | 367               | 83                  | 6,5                 | 1,5              | 0,15              | 0,3                  |
| 3"   | 8                       | 2,9              | 16               | 0,8     | 87,8                      | 740               | 589                 | 17                  | 4,6              | 0,15              | 0,3                  |
|      | 14,5                    | 9,5              | 23               | 0,8     | 87,8                      | 412               | 103                 | 9,6                 | 2,6              | 0,15              | 0,3                  |
| 4"   | 10,5                    | 3,2              | 16               | 1,3     | 135,2                     | 616               | 700                 | 22                  | 8,8              | 0,15              | 0,3                  |
|      | 17,5                    | 10               | 23               | 1,8     | 135                       | 523               | 172                 | 19                  | 6,4              | 0,15              | 0,3                  |
| 5"   | 10                      | 2,3              | 14               | 1,9     | 180,7                     | 725               | 1483                | 35                  | 17               | 0,25              | 0,4                  |
|      | 17,5                    | 7                | 20               | 1,9     | 180,7                     | 415               | 277                 | 20                  | 9,5              | 0,25              | 0,4                  |
| 6"   | 13                      | 3,4              | 15               | 3,1     | 260,2                     | 890               | 1450                | 62                  | 25               | 0,25              | 0,4                  |
|      | 23,5                    | 11               | 21               | 3,1     | 260,2                     | 495               | 253                 | 35                  | 14               | 0,25              | 0,4                  |
| 8"   | 15                      | 2,5              | 13               | 5,4     | 436                       | 850               | 3406                | 100                 | 64               | 0,35              | 0,5                  |
|      | 26                      | 7,5              | 19               | 5,4     | 436                       | 486               | 634                 | 57                  | 37               | 0,35              | 0,5                  |
| 10"  | 17,5                    | 2,5              | 13               | 11      | 672                       | 975               | 5008                | 179                 | 146              | 0,4               | 0,6                  |
|      | 30,5                    | 8                | 18               | 11      | 672                       | 558               | 932                 | 102                 | 84               | 0,4               | 0,6                  |
| 12"  | 20                      | 2,8              | 12               | 18      | 932                       | 1188              | 6676                | 302                 | 265              | 0,5               | 0,75                 |
|      | 35                      | 8,5              | 18               | 18      | 932                       | 679               | 1249                | 173                 | 151              | 0,5               | 0,75                 |
| 14"  | 21                      | 2,7              | 12               | 22      | 1116                      | 1190              | 7596                | 363                 | 347              | 0,5               | 0,75                 |
|      | 36                      | 8,5              | 17               | 22      | 1116                      | 680               | 1414                | 207                 | 198              | 0,5               | 0,75                 |
| 16"  | 22                      | 2,7              | 11               | 39      | 1439                      | 1605              | 11370               | 635                 | 672              | 0,7               | 0,9                  |
|      | 44                      | 11               | 18               | 39      | 1439                      | 803               | 1423                | 318                 | 336              | 0,7               | 0,9                  |
| 18"  | 25                      | 3,5              | 11               | 53      | 1830                      | 1500              | 8246                | 756                 | 750              | 0,7               | 0,9                  |
|      | 45                      | 11,5             | 16               | 53      | 1830                      | 834               | 1417                | 421                 | 417              | 0,7               | 0,9                  |
| 20"  | 24                      | 2,5              | 9,6              | 66      | 2254                      | 1673              | 16890               | 1040                | 1248             | 1                 | 1                    |
|      | 48                      | 10               | 16               | 66      | 2254                      | 837               | 2111                | 520                 | 624              | 1                 | 1                    |
| 24"  | 24                      | 2                | 8,1              | 97      | 3190                      | 1675              | 25274               | 1483                | 2297             | 1                 | 1                    |
|      | 48                      | 8                | 13               | 97      | 3190                      | 838               | 3161                | 742                 | 1149             | 1                 | 1                    |

Reduction factors for application pressure, temperature related, acc. to flange material 1E1:

| temperature    | °C   | 20  | 100 | 150   | 200  | 230  |
|----------------|------|-----|-----|-------|------|------|
|                | °F   | 68  | 212 | 302   | 392  | 450  |
| appl. pressure | bar  | 25  | 20  | 18,7  | 17,2 | 15,5 |
|                | psig | 355 | 284 | 265,5 | 244  | 220  |

Flange material to select according to service temperature.

# PTFE Lined Pipe Spools (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series |           | Select Series  |   |   |  |  |  |
|--------------|--------------|-----------|--|---|---|--|--|--|
|              | L x L        | F x L     | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   |  |  |  |
|              | Class 150    | Class 150 |  |   |   |  |  |  |
| 1/2"         | ◆◆           | ●         |  |   |   |  |  |  |
| 3/4"         | ◆◆           | ●         |  |   |   |  |  |  |
| 1"           | ◆            | ●         | ◆◆   | ● |   |  |  |  |
| 1.5"         | ◆            | ●         | ◆◆   | ● |   |  |  |  |
| 2"           | ◆            | ●         | ◆◆   | ● |   |  |  |  |
| 3"           | ◆            | ●         | ◆◆   | ● |   |  |  |  |
| 4"           | ◆            | ●         | ◆◆   | ● |   |  |  |  |
| 6"           | ◆            | ●         | ◆◆   | ● | ✓ |  |  |  |
| 8"           | ◆            | ●         | ◆◆   | ∅ | ✓ |  |  |  |
| 10"          | ◆◆◆          | ∅         |  |   | ✓ |  |  |  |
| 12"          | ◆◆◆          | ∅         |  |   | ✓ |  |  |  |
| 14"          | ◆◆◆          | ∅         |  |   |   |  |  |  |
| 16"          | ◆◆◆          | ∅         |  |   |   |  |  |  |
| 18"          | ◆◆◆          | ○         |  |   |   |  |  |  |
| 20"          | ◆◆◆          | ○         |  |   |   |  |  |  |
| 24"          | ◆◆◆          | ○         |  |   |   |  |  |  |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

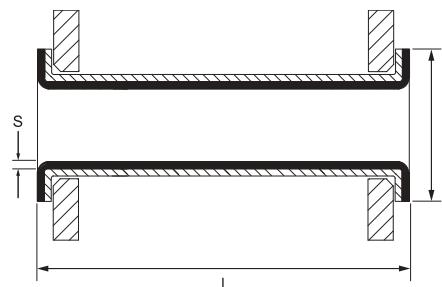
# PTFE Lined Pipe Spools (ANSI)

0104

## Welded Steel

### Dimensional Data per Class 150

| Size | Value Series   |                |                   | Select Series  |                |                   | C<br>(mm) | Weight (ca. kg) |                |
|------|----------------|----------------|-------------------|----------------|----------------|-------------------|-----------|-----------------|----------------|
|      | Min. L<br>(mm) | Max. L<br>(mm) | S<br>±10%<br>(mm) | Min. L<br>(mm) | Max. L<br>(mm) | S<br>±10%<br>(mm) |           | Per<br>Meter    | Two<br>Flanges |
| 1/2" |                |                |                   | 115            | 6000           | 2.5               | 35        | 1.2             | 1.5            |
| 3/4" |                |                |                   | 130            | 5000           | 3                 | 43        | 1.6             | 2              |
| 1"   | 77             | 6096           | 3.5               | 140            | 6000           | 3                 | 51        | 2.5             | 2.5            |
| 1.5" | 86             | 6096           | 4                 | 150            | 6000           | 3                 | 73        | 4.5             | 4.2            |
| 2"   | 89             | 6096           | 4                 | 155            | 6000           | 3                 | 92        | 5.8             | 5.5            |
| 3"   | 102            | 6096           | 4                 | 185            | 6000           | 3.5               | 127       | 10              | 8.3            |
| 4"   | 112            | 6096           | 4                 | 200            | 6000           | 4.5               | 157       | 14              | 9.9            |
| 6"   | 140            | 6096           | 7                 | 235            | 6000           | 5                 | 216       | 23.5            | 16             |
| 8"   | 166            | 6096           | 8                 | 265            | 6000           | 6.25              | 270       | 39              | 23             |
| 10"  |                |                |                   | 270            | 4000           | 6.75              | 324       | 55.5            | 31             |
| 12"  |                |                |                   | 285            | 3500           | 8                 | 381       | 74              | 39             |
| 14"  |                |                |                   | 320            | 3000           | 9                 | 412       | 85              | 52             |
| 16"  |                |                |                   | 325            | 2500           | 10                | 470       | 102             | 67             |
| 18"  |                |                |                   | 340            | 3500           | 6.5               | 534       | 130             | 85             |
| 20"  |                |                |                   | 365            | 2500           | 6.5               | 585       | 155             | 90             |
| 24"  |                |                |                   | 375            | 1000           | 4.5               | 692       | 204             | 116            |



#### Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on each end of pipe.
- 3.) Weld buttons are located approximately 25mm behind each flange.

### Part Number System

|          |      |  |   |                                |                              |                 |  |                         |   |
|----------|------|--|---|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| 1        | BOG  | 250  | 15  | W                              | XX                           | FF              | 0  | 0XX                     |   |
| Type     |      | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series   | Options                 |   |
| Finished | Pipe | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined 90 Degree Elbow (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Diameter | Value Series |           | Select Series   |   |   |   |   |   |   |
|------------------|--------------|-----------|---|---|---|---|---|---|---|
|                  | L x L        | F x F     | Options below not available on stock items. Option selection may affect manufacturing lead time.<br>Consult factory for price and delivery. |   |   |   |   |   |   |
|                  | Class 150    | Class 150 |   |   |   |   |   |   |   |
| 1/2"             | ◆◆           | ●         |   |   | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3/4"             | ◆◆           | ●         |   |   | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1.5"             | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 8"               | ◆◆           | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 10"              | ◆◆           | ● ■       | ◆◆◆   | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 12"              | ◆◆           | ● ■       | ◆◆◆   | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 14"              |              |           | ◆◆◆   | ∅ | ✓ | ✓ | ✓ |   | ✓ |
| 16"              |              |           | ◆◆◆   | ∅ | ✓ | ✓ | ✓ |   | ✓ |
| 18"              |              |           | ◆◆◆   | ○ | ✓ | ✓ | ✓ |   | ✓ |
| 20"              |              |           | ◆◆◆   | ○ | ✓ | ✓ | ✓ |   | ✓ |
| 24"              |              |           | ◆◆◆   | ○ | ✓ | ✓ | ✓ |   | ✓ |

\* Class 300 subject to CE approval

† These options also available in Value Series

24" 90 Ell is made of three parts

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

- |   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |
|   | ■ Ductile Iron Body - Fixed Flanges           |

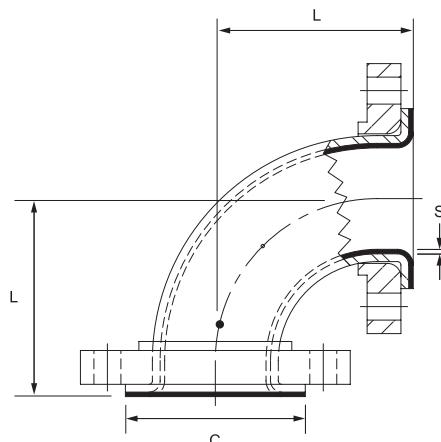
# PTFE Lined 90 Deg. Elbow (ANSI)

0104

## Welded Steel

Dimensional Data per Class 150

| Size | L (mm) | C (mm) | S ±10%(mm)   |               | Weight<br>(ca. kg) |
|------|--------|--------|--------------|---------------|--------------------|
|      |        |        | Value Series | Select Series |                    |
| 1/2" | 75     | 35     |              | 3             | 1.5                |
| 3/4" | 89     | 43     |              | 3             | 2.1                |
| 1"   | 89     | 51     | 3.5          | 3             | 2.7                |
| 1.5" | 102    | 73     | 3.5          | 4             | 4                  |
| 2"   | 114    | 92     | 3.5          | 4             | 6.4                |
| 3"   | 140    | 127    | 3.5          | 4.5           | 12                 |
| 4"   | 165    | 158    | 7.5          | 4.5           | 19                 |
| 6"   | 203    | 216    | 9.5          | 8             | 36                 |
| 8"   | 229    | 270    | 13           | 9             | 57                 |
| 10"  | 279    | 324    | 14.5         | 13            | 82                 |
| 12"  | 305    | 381    | 16.5         | 10            | 111                |
| 14"  | 600    | 412    |              | 12            | 165                |
| 16"  | 610    | 470    |              | 13            | 192                |
| 18"  | 673    | 534    |              | 13            | 235                |
| 20"  | 736    | 585    |              | 13            | 280                |
| 24"  | 864    | 692    |              | 6.5           | 395                |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of elbow in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

## Part Number System

| 1        | B90           | 250  | 15  | W                              | XX                           | FF              | 0  | 0XX                     |   |
|----------|---------------|--|---|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting       | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series   | Options                 |   |
| Finished | 90 Deg. Elbow | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined 45 Degree Elbow (ANSI)

*ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont*



| Nominal Diameter | Value Series |           | Select Series   |   |   |   |   |   |   |
|------------------|--------------|-----------|---|---|---|---|---|---|---|
|                  | L x L        | F x F     | Options below not available on stock items. Option selection may affect manufacturing lead time.<br>Consult factory for price and delivery. |   |   |   |   |   |   |
|                  | Class 150    | Class 150 |   |   |   |   |   |   |   |
|                  |              |           |   |   |   |   |   |   |   |
| 1/2"             |              | ◆◆        | ●   |   | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3/4"             |              | ◆◆        | ●   |   | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1"               | ◆ (F x F) ●  | ◆◆        | ●   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1.5"             | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6"               | ◆            | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 8"               | ◆◆ (F x F) ● | ◆◆        | ●   | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 10"              | ◆◆           | ● ■       | ◆◆◆   | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 12"              | ◆◆           | ● ■       | ◆◆◆   | ● | ✓ | ✓ | ✓ | ✓ | ✓ |
| 14"              |              |           | ◆◆◆   | ∅ | ✓ | ✓ | ✓ |   | ✓ |
| 16"              |              |           | ◆◆◆   | ∅ | ✓ | ✓ | ✓ |   | ✓ |
| 18"              |              |           | ◆◆◆   | ○ | ✓ | ✓ | ✓ |   | ✓ |
| 20"              |              |           | ◆◆◆   | ○ | ✓ | ✓ | ✓ |   | ✓ |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |
|  | ■ Ductile Iron Body - Fixed Flanges           |

# PTFE Lined 45 Deg. Elbow (ANSI)

0104

## Welded Steel

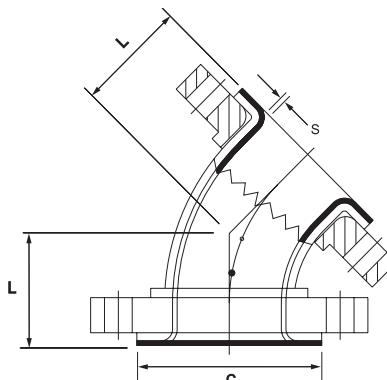
Dimensional Data per Class 150

| Size | L (mm)       |              |               |              | C<br>(mm) | S ±10% (mm)  |               | Weight<br>(ca. kg) |  |  |
|------|--------------|--------------|---------------|--------------|-----------|--------------|---------------|--------------------|--|--|
|      | Value Series |              | Select Series |              |           | Value Series | Select Series |                    |  |  |
|      | Fixed Flange | Loose Flange | Fixed Flange  | Loose Flange |           |              |               |                    |  |  |
| 1/2" | 45           | 45           | 45            | 60*          | 35        | 3            | 1.7           |                    |  |  |
| 3/4" |              |              | 45            | 60*          | 43        |              | 3             | 2                  |  |  |
| 1"   |              |              | 45            | 60*          | 51        | 3.5          | 3             | 3                  |  |  |
| 1.5" | 45           | 57           | 57            | 75*          | 73        | 3.5          | 4             | 6                  |  |  |
| 2"   |              | 64           | 64            | 80*          | 92        | 3.5          | 4             | 9                  |  |  |
| 3"   |              | 76           | 76            | 90*          | 127       | 3.5          | 4.5           | 15                 |  |  |
| 4"   |              | 102          | 102           |              | 157       | 7.5          | 4.5           | 20                 |  |  |
| 6"   |              | 127          | 127           |              | 216       | 9.5          | 8             | 33                 |  |  |
| 8"   |              | 140          | 140           |              | 270       | 8            | 9             | 54                 |  |  |
| 10"  |              | 165          | 165           |              | 324       | 13           | 13            | 75                 |  |  |
| 12"  |              | 190          | 190           |              | 381       | 16.5         | 10            | 110                |  |  |
| 14"  |              | 285**        |               | 412          | 12        | 125          |               |                    |  |  |
| 16"  |              | 325**        |               | 470          |           | 13           |               | 145                |  |  |
| 18"  |              | 305**        |               | 534          |           | 13           |               | 185                |  |  |
| 20"  |              | 390**        |               | 585          |           | 13           |               | 210                |  |  |

\* 1/2" - 3" Select Series loose flange requires longer than standard "L" dimension.

Value Series "L" dimension is ANSI Class 150 standard for fixed or loose flange.

\*\* L dimension extended



### Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of elbow in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

### Part Number System

|          |               |   |  |                             |                           |                 |  |                         |   |
|----------|---------------|---|--|-----------------------------|---------------------------|-----------------|--|-------------------------|---|
| 1        | B45           | 250   | 15   | W                           | XX                        | FF              | 0  | 0XX                     |   |
| Type     | Fitting       | Diameter  | Pressure   | Liner                       | Resin Type                | Flanges         | Series   | Options                 |   |
| Finished | 45 Deg. Elbow | 015 - 1/2" 020 - 3/4" 025 - 1" 040 - 1 1/2" 050 - 2" 080 - 3" 100 - 4" 150 - 6" | 200 - 8" 250 - 10" 300 - 12" 350 - 14" 400 - 16" 450 - 18" 500 - 20" | 15 - ANSI 150 30 - ANSI 300 | W - White E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Equal Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series |           | Select Series   |                            |  |  |  |  |  |
|--------------|--------------|-----------|---|----------------------------|--|--|--|--|--|
|              | L x L x L    | F x F x F | <i>Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery.</i> |                            |  |  |  |  |  |
|              | Class 150    | Class 150 |   |                            |  |  |  |  |  |
| 1/2"         | ◆◆           | ●         | Class 300 Figs * (Class 150 Dims)   |                            |  |  |  |  |  |
| 3/4"         | ◆◆           | ●         |   | Short Stack (Ductile Iron) |  |  |  |  |  |
| 1"           | ◆            | ●         |   | Loose Flanges              |  |  |  |  |  |
| 1.5"         | ◆            | ●         |   | Stainless Steel Housing    |  |  |  |  |  |
| 2"           | ◆            | ●         |   | Conductive Liner           |  |  |  |  |  |
| 3"           | ◆            | ●         |   | Heavy Duty Liner           |  |  |  |  |  |
| 4"           | ◆            | ●         |   | Special Paint†             |  |  |  |  |  |
| 6"           | ◆            | ●         |   | Earthing Studs†            |  |  |  |  |  |
| 8"           | ◆◆           | ●         |   | Vent Extenders†            |  |  |  |  |  |
| 10"          | ◆◆           | ●         |   | PFA-Lined                  |  |  |  |  |  |
| 12"          | ◆◆           | ◎         |   | 2-Pc Body Construction     |  |  |  |  |  |
| 14"          |              |           |   | Standard                   |  |  |  |  |  |
| 16"          |              |           |   |                            |  |  |  |  |  |
| 18"          |              |           |   |                            |  |  |  |  |  |
| 20"          |              |           |   |                            |  |  |  |  |  |
| 24"          |              |           |   |                            |  |  |  |  |  |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

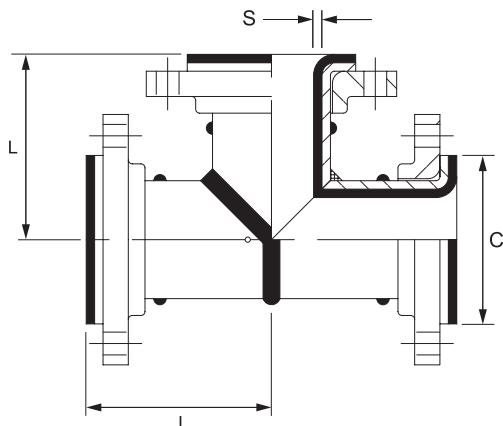
# PTFE Lined Equal Tee (ANSI)

0104

## Welded Steel

Dimensional Data per Class 150

| Size | L (mm) | C (mm) | S ±10%(mm)   |               | Weight<br>(ca. kg) |
|------|--------|--------|--------------|---------------|--------------------|
|      |        |        | Value Series | Select Series |                    |
| 1/2" | 65     | 37     |              | 4             | 2.5                |
| 3/4" | 75     | 45     |              | 4.5           | 3.2                |
| 1"   | 89     | 51     | 3.5          | 3.5           | 5.5                |
| 1.5" | 102    | 73     | 3.5          | 4.5           | 9.5                |
| 2"   | 114    | 92     | 4.5          | 4.5           | 11.5               |
| 3"   | 140    | 127    | 6            | 5             | 19.5               |
| 4"   | 165    | 157    | 6            | 6             | 24                 |
| 6"   | 203    | 216    | 8.5          | 7             | 45                 |
| 8"   | 229    | 270    | 11.5         | 10            | 72                 |
| 10"  | 280    | 324    | 13           | 13            | 120                |
| 12"  | 305    | 381    | 14.5         | 13            | 160                |
| 14"  | 356    | 412    |              | 6.5           | 312                |
| 16"  | 381    | 470    |              | 6.5           | 375                |
| 18"  | 419    | 534    |              | 6.5           | 400                |
| 20"  | 457    | 585    |              | 6.5           | 420                |
| 24"  | 500    | 692    |              | 4.5           | 580                |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of tee in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

## Part Number System

| 1        | TEE       | 250  | 15  | W                              | XX                           | FF              | 0  | 0XX                     |   |
|----------|-----------|--|---|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting   | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series   | Options                 |   |
| Finished | Equal Tee | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Reducing Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



1" - 6"

| Major Size | Minor Size | Value Series |           | Select Series                    |               |                         |                  |                  | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |  |
|------------|------------|--------------|-----------|----------------------------------|---------------|-------------------------|------------------|------------------|--|--|
|            |            | L x L x L    | F x F x F |                                  |               |                         |                  |                  |  |  |
|            |            | Class 150    | Class 150 |                                  |               |                         |                  |                  |  |  |
|            |            |              |           | Class 300 Flgs* (Class 150 Dims) | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner |  |  |
| 1"         | 1/2"       | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                | Standard   |  |
|            | 3/4"       | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
| 1.5"       | 1/2"       | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                | Standard   |  |
|            | 3/4"       | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 1"         | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
| 2"         | 1"         | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                | ✓  |  |
|            | 1.5"       | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
| 3"         | 1"         | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                | ✓  |  |
|            | 1.5"       | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 2"         | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
| 4"         | 1"         | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                | ✓  |  |
|            | 1.5"       | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 2"         | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 3"         | ◆            | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
| 6"         | 1"         | ◆◆           | ○         | ✓                                | ✓             | ✓                       | ✓                | ✓                | ✓  |  |
|            | 1.5"       | ◆◆           | ○         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 2"         | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 3"         | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |
|            | 4"         | ◆◆           | ●         | ✓                                | ✓             | ✓                       | ✓                | ✓                |  |  |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                             |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ○ Reduced Vacuum Resistance at Elevated Temperature |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                                  |

# PTFE Lined Reducing Tee (ANSI)

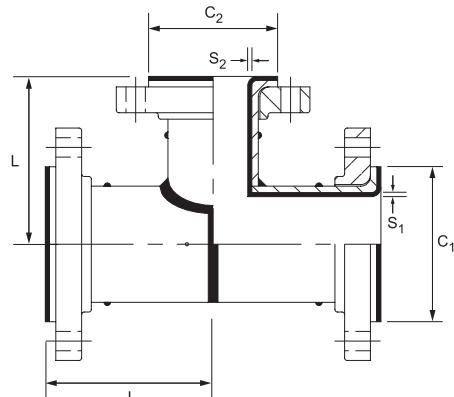
0104

*Welded Steel*

1" - 6"

Dimensional Data per Class 150

| Major Size | Minor Size | L / L <sub>A</sub> (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm)   |                |                |                | Weight (ca. Kg) |  |
|------------|------------|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|--|
|            |            |                         |                |                | Value Series   |                | Select Series  |                |                 |  |
|            |            |                         |                |                | S <sub>1</sub> | S <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> |                 |  |
| 1"         | 1/2"       | 89                      | 51             | 37             |                |                | 4              | 4              | 3.7             |  |
|            | 3/4"       |                         |                | 45             |                |                |                |                | 3.9             |  |
| 1.5"       | 1/2"       | 102                     | 73             | 37             |                |                | 4              | 4              | 5.3             |  |
|            | 3/4"       |                         |                | 45             |                |                |                |                | 5.5             |  |
|            | 1"         |                         |                | 51             | 4              | 3.4            | 4.5            | 3.5            | 8               |  |
| 2"         | 1"         | 114                     | 92             | 51             | 5              | 3.4            | 4.5            | 3.5            | 8.9             |  |
|            | 1.5"       |                         |                | 73             |                | 4              |                | 4.5            | 10.5            |  |
| 3"         | 1"         | 140                     | 127            | 51             | 6              | 3.4            | 5              | 3.5            | 16              |  |
|            | 1.5"       |                         |                | 73             |                | 4              |                | 4.5            | 17              |  |
|            | 2"         |                         |                | 92             |                | 4.5            |                | 4.5            | 17.5            |  |
| 4"         | 1"         | 165                     | 158            | 51             | 6              | 4              | 6              | 3.5            | 19              |  |
|            | 1.5"       |                         |                | 73             |                | 4              |                | 4.5            | 21              |  |
|            | 2"         |                         |                | 92             |                | 4.5            |                | 4.5            | 22              |  |
|            | 3"         |                         |                | 127            |                | 6              |                | 5              | 24              |  |
| 6"         | 1"         | 203                     | 216            | 51             | 9              |                | 7              | 3.5            | 28.5            |  |
|            | 1.5        |                         |                | 73             |                |                |                | 4.5            | 31              |  |
|            | 2"         |                         |                | 92             |                | 4.5            |                | 4.5            | 32              |  |
|            | 3"         |                         |                | 127            |                | 6              |                | 5              | 34              |  |
|            | 4"         |                         |                | 158            |                | 9              |                | 6              | 35.4            |  |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of tee in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

For loose stack flange on 6" Select Series, L<sub>A</sub> = L + 30mm

Part Number System

| 1        | RTE          | XXX             | 15                             | W                            | XX              | FF   | 0                       | 0XX   |
|----------|--------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting      | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges  | Series                  | Options   |
| Finished | Reducing Tee | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Reducing Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



8" - 14"

| Major Size | Minor Size             | Value Series |           | Select Series  |                |               |                         |                  |                  |
|------------|------------------------|--------------|-----------|--|----------------|---------------|-------------------------|------------------|------------------|
|            |                        | L x L x L    | F x F x F | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |                |               |                         |                  |                  |
|            |                        | Class 150    | Class 150 |  |                |               |                         |                  |                  |
|            |                        |              |           | Class 300 Figs*  | Class 150 Dims | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner |
| 8"         | 2"                     | ◆◆           | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 3"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 4"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 6"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
| 10"        | 2"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 4"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 6"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 8"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
| 12"        | 2"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                | ✓                |
|            | 4"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 6"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 8"                     | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 10"                    | ◆◆ ●         | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
| 14"        | 2"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 4"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | 8"                     | ◆◆◆          | ∅         | ✓  | ✓              | ✓             | ✓                       | ✓                |                  |
|            | Standard               |              |           |  |                |               |                         |                  |                  |
|            | Special Paint†         |              |           |  |                |               |                         |                  |                  |
|            | Earthing Studs†        |              |           |  |                |               |                         |                  |                  |
|            | Vent Extenders†        |              |           |  |                |               |                         |                  |                  |
|            | 2-Pc Body Construction |              |           |  |                |               |                         |                  |                  |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                             |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temperature |
| ◆◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                                  |

# PTFE Lined Reducing Tee (ANSI)

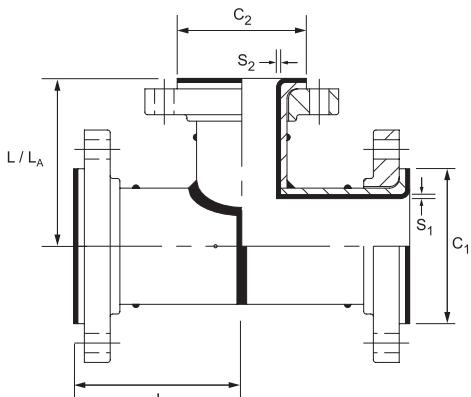
0104

*Welded Steel*

8" - 14"

Dimensional Data per Class 150

| Major Size | Minor Size | L / L <sub>A</sub> (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm)   |                | Weight (ca. Kg) |  |
|------------|------------|-------------------------|----------------|----------------|----------------|----------------|-----------------|--|
|            |            |                         |                |                | Value Series   |                |                 |  |
|            |            |                         |                |                | S <sub>1</sub> | S <sub>2</sub> |                 |  |
| 8"         | 2"         | 229                     | 270            | 92             | 11.5           |                | 4.5 56          |  |
|            | 3"         |                         |                | 127            |                | 6              | 5 59            |  |
|            | 4"         |                         |                | 158            |                | 6              | 6 63            |  |
|            | 6"         |                         |                | 216            |                | 8.5            | 7 68            |  |
| 10"        | 2"         | 280                     | 324            | 92             | 13.5           |                | 4.5 83          |  |
|            | 4"         |                         |                | 158            |                |                | 6 89            |  |
|            | 6"         |                         |                | 216            |                | 8.5            | 7 95            |  |
|            | 8"         |                         |                | 270            |                | 11.5           | 7 100           |  |
| 12"        | 2"         | 305                     | 381            | 92             | 14.5           |                | 4.5 118         |  |
|            | 4"         |                         |                | 158            |                |                | 6 125           |  |
|            | 6"         |                         |                | 216            |                | 6.5            | 7 133           |  |
|            | 8"         |                         |                | 270            |                | 9              | 7 140           |  |
|            | 10"        |                         |                | 324            |                | 13             | 13 149          |  |
| 14"        | 2"         | 356                     | 412            | 92             | 6.5            |                | 3 176           |  |
|            | 4"         |                         |                | 158            |                |                | 4.5 192         |  |
|            | 8"         |                         |                | 270            |                |                | 6 294           |  |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of tee in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

For loose stack flange on 8" - 14" Select Series, L<sub>A</sub> = L + 30mm

## Part Number System

| 1    | RTE     | XXX      | 15       | W     | XX         | FF      | 0      | 0XX     |
|------|---------|----------|----------|-------|------------|---------|--------|---------|
| Type | Fitting | Diameter | Pressure | Liner | Resin Type | Flanges | Series | Options |

|          |              |                 |                                |                              |                 |  |                         |   |
|----------|--------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Finished | Reducing Tee | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |
|----------|--------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|

# PTFE Lined Reducing Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



16" - 24"

| Major Size | Minor Size | Value Series<br>Not Available in<br>These Sizes | Select Series  |                                  |               |                         |                  |                  |               |                |
|------------|------------|---|--|----------------------------------|---------------|-------------------------|------------------|------------------|---------------|----------------|
|            |            |   | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |                                  |               |                         |                  |                  |               |                |
|            |            |   | Class 150  | Class 300 Flgs* (Class 150 Dims) | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint | Earthing Studs |
| 16"        | 1"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 2"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 4"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 12"        | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
| 18"        | 1"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 2"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 4"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 12"        | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
| 20"        | 1"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 2"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 4"         | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 12"        | ◆◆◆   | ∅  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
| 24"        | 1"         | ◆◆◆   | ○  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 2"         | ◆◆◆   | ○  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 4"         | ◆◆◆   | ○  |                                  | ✓             | ✓                       | ✓                |                  |               |                |
|            | 12"        | ◆◆◆   | ○  |                                  | ✓             | ✓                       | ✓                |                  |               |                |

\* Class 300 subject to CE approval

† These options also available in Value Series

Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                             |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temperature |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                                  |

# PTFE Lined Reducing Tee (ANSI)

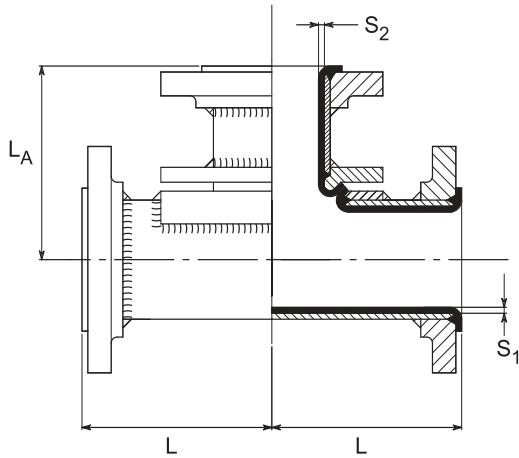
0104

*Welded Steel*

16" - 24"

Dimensional Data per Class 150

| Major Size | Minor Size | L / L <sub>A</sub> (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm)   |                | Weight (ca. Kg) |
|------------|------------|-------------------------|----------------|----------------|----------------|----------------|-----------------|
|            |            |                         |                |                | S <sub>1</sub> | S <sub>2</sub> |                 |
| 16"        | 1"         | 381                     | 470            | 51             | 6.5            | 3              | 229             |
|            | 2"         |                         |                | 92             |                | 3              | 234             |
|            | 4"         |                         |                | 157            |                | 4.5            | 249             |
|            | 12"        |                         |                | 381            |                | 6.5            | 362             |
| 18"        | 1"         | 419                     | 534            | 51             | 6.5            | 3              | 302             |
|            | 2"         |                         |                | 92             |                | 3              | 308             |
|            | 4"         |                         |                | 157            |                | 4.5            | 324             |
|            | 12"        |                         |                | 381            |                | 6.5            | 441             |
| 20"        | 1"         | 457                     | 585            | 51             | 6.5            | 3              | 279             |
|            | 2"         |                         |                | 92             |                | 3              | 285             |
|            | 4"         |                         |                | 157            |                | 4.5            | 299             |
|            | 12"        |                         |                | 381            |                | 6.5            | 413             |
| 24"        | 1"         | 500*                    | 692            | 51             | 4.5            | 3              | 363             |
|            | 2"         |                         |                | 92             |                | 3              | 369             |
|            | 4"         |                         |                | 157            |                | 4.5            | 383             |
|            | 12"        |                         |                | 381            |                | 6.5            | 497             |



Notes:

- 1.) Drawing shows typical Select Series construction
- 2.) Vent holes are located on side of tee in center.

For loose stack flange on Select Series, L<sub>A</sub> = L + 30mm

\* 24" L dimension is shorter than ANSI B16.5 Class 150 standard

## Part Number System

| 1        | RTE          | XXX             | 15                             | W                            | XX              | FF   | 0          | 0XX   |
|----------|--------------|-----------------|--------------------------------|------------------------------|-----------------|--|------------|---|
| Type     | Fitting      | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges  | Series     | Options   |
| Finished | Reducing Tee | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Equal Cross (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series |           | Select Series   |                  |                            |               |                         |                  |                  |
|--------------|--------------|-----------|---|------------------|----------------------------|---------------|-------------------------|------------------|------------------|
|              | L x L x L    | F x F x F | <i>Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery.</i> |                  |                            |               |                         |                  |                  |
|              | Class 150    | Class 150 |   |                  |                            |               |                         |                  |                  |
| 1/2"         | ◆◆           | ●         | Class 300 Flgs*   | (Class 150 Dims) | Short Stack (Ductile Iron) | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner |
| 3/4"         | ◆◆           | ●         |   |                  | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 1"           | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 1.5"         | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 2"           | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 3"           | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 4"           | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 6"           | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 8"           | ◆◆           | ●         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 10"          | ◆◆◆          | ◎         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 12"          | ◆◆◆          | ◎         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 14"          | ◆◆◆          | ◎         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 16"          | ◆◆◆          | ◎         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 18"          | ◆◆◆          | ○         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 20"          | ◆◆◆          | ○         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                | ✓                |
| 24"          | ◆◆◆          | ○         | ✓   | ✓                | ✓                          | ✓             | ✓                       | ✓                |                  |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)        | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                            |

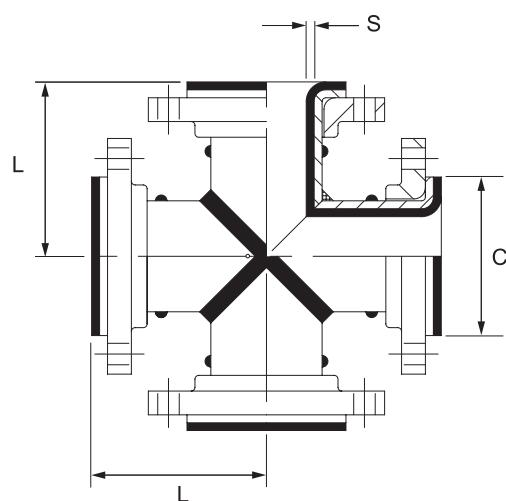
# PTFE Lined Equal Cross (ANSI)

0104

## Welded Steel

Dimensional Data per Class 150

| Size | L (mm) | C (mm) | S ±10%(mm)   |               | Weight<br>(ca. kg) |
|------|--------|--------|--------------|---------------|--------------------|
|      |        |        | Value Series | Select Series |                    |
| 1/2" | 65     | 37     |              | 4             | 3.2                |
| 3/4" | 75     | 45     |              | 4.5           | 4                  |
| 1"   | 89     | 51     | 3.5          | 3.5           | 5.5                |
| 1.5" | 102    | 73     | 3.5          | 4.5           | 8.7                |
| 2"   | 114    | 92     | 4            | 4.5           | 13                 |
| 3"   | 140    | 127    | 4            | 5             | 23.2               |
| 4"   | 165    | 157    | 4            | 6             | 39.1               |
| 6"   | 203    | 216    | 6            | 7             | 65.9               |
| 8"   | 229    | 270    | 7            | 10            | 99                 |
| 10"  | 280    | 324    |              | 13            | 160                |
| 12"  | 305    | 381    |              | 13            | 213                |
| 14"  | 356    | 412    |              | 6.5           | 380                |
| 16"  | 381    | 470    |              | 6.5           | 480                |
| 18"  | 419    | 534    |              | 6.5           | 525                |
| 20"  | 457    | 585    |              | 6.5           | 550                |
| 24"  | 500    | 692    |              | 4.5           | 730                |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of cross in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

## Part Number System

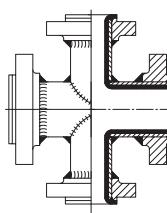
| 1        | KRE         | 250  | 15  | W                              | XX                           | FF              | 0  | 0XX                     |   |
|----------|-------------|--|---|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting     | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series   | Options                 |   |
| Finished | Equal Cross | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE-Lined Reducing Cross (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

3/4" - 8"



| Major Size | Minor Size | Value Series<br>Reducing Crosses<br>Not Available | Value Series  | Select Series | Options   |               |                         |                  |                  |               |
|------------|------------|---|---|---------------|---|---------------|-------------------------|------------------|------------------|---------------|
|            |            |   | F x F x F x F   | Class 150     | Options below not available on stock items.<br>Option selection may affect manufacturing lead time. Consult factory for price and delivery. |               |                         |                  |                  |               |
|            |            |   |  |               | Class 300   | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint |
| 3/4"       | 1/2"       |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
| 1"         | 1/2"       |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
|            | 3/4"       |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
| 1.5"       | 1/2"       |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
|            | 3/4"       |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
| 2"         | 1"         |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
|            | 1.5"       |   | ◆◆  | ●             | ✓   | ✓             | ✓                       | ✓                | ✓                |               |
| 3"         | 1"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
|            | 1.5"       |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
|            | 2"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
| 4"         | 1"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
|            | 2"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
|            | 3"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
| 6"         | 4"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |
| 8"         | 6"         |   | ◆◆  | ∅             | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓             |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

|   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |

# PTFE Lined Reducing Cross (ANSI)

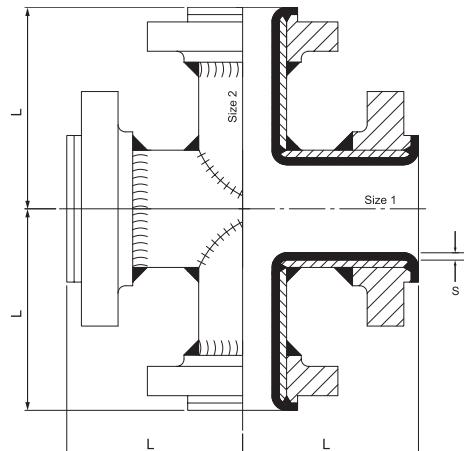
*Welded Steel*

0104

3/4" - 8"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|----------------|----------------|-----------------|
| 3/4"       | 1/2"       | 75     | 45             | 37             | 4              | 4              | 3.5             |
| 1"         | 1/2"       | 89     | 51             | 37             | 4              | 4              | 4.8             |
|            | 3/4"       |        |                | 45             |                |                | 5               |
| 1.5"       | 1/2"       | 102    | 73             | 37             | 4              | 4              | 8.3             |
|            | 1"         |        |                | 51             | 4.5            | 3.5            | 11              |
| 2"         | 1"         | 114    | 92             | 51             | 4.5            | 3.5            | 12              |
|            | 1.5"       |        |                | 73             |                |                | 14              |
| 3"         | 1"         | 140    | 127            | 51             | 5              | 3.5            | 21              |
|            | 1.5"       |        |                | 73             |                | 4.5            | 23              |
|            | 2"         |        |                | 92             |                | 4.5            | 24              |
| 4"         | 1"         | 165    | 158            | 51             | 6              | 3.5            | 25              |
|            | 2"         |        |                | 51             |                | 4.5            | 30              |
|            | 3"         |        |                | 127            |                | 5              | 32              |
| 6"         | 4"         | 203    | 216            | 158            | 7              | 6              | 48              |
| 8"         | 6"         | 229    | 270            | 216            | 10             | 7              | 91              |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of tee in center.

## Part Number System

| 1        |                | 250   | 15   | W                           | XX                        | FF              | 0  | 0XX        |  |
|----------|----------------|---|--|-----------------------------|---------------------------|-----------------|--|------------|--|
| Type     | Fitting        | Diameter  | Pressure   | Liner                       | Resin Type                | Flanges         | Series   | Options    |  |
| Finished | Reducing Cross | 015 - 1/2" 020 - 3/4" 025 - 1" 040 - 1 1/2" 050 - 2" 080 - 3" 100 - 4" 150 - 6" | 200 - 8" 250 - 10" 300 - 12" 350 - 14" 400 - 16" 450 - 18" 500 - 20" 600 - 24" | 15 - ANSI 150 30 - ANSI 300 | W - White E - Anti-Static | Factory Defined | FF - Fixed/Fixed FL - Fixed/Loose LL - Loose/Loose | 0 - Select | 0XX - Standard 052 - Earthing Stud 054 - Vent Boss 070 - Stainless Steel |

# PTFE-Lined Reducing Cross (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

10"-24"



| Major Size | Minor Size | Value Series<br>Reducing Crosses<br>Not Available | Value Series  | Select Series | Options  |               |                         |                  |                  |               |                |                |
|------------|------------|---|---------------|---------------|--|---------------|-------------------------|------------------|------------------|---------------|----------------|----------------|
|            |            |   | F x F x F x F | Class 150     | Options below not available on stock items.<br>Option selection may affect manufacturing lead<br>time. Consult factory for price and delivery. |               |                         |                  |                  |               |                |                |
|            |            |   |               |               | Class 300  | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint | Earthing Studs | Vent Extenders |
| 10"        | 6"         |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             |                |                |
|            | 8"         |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             |                |                |
| 12"        | 8"         |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             |                |                |
|            | 10"        |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             |                |                |
| 14"        | 8"         |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             |                |                |
|            | 12"        |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
| 16"        | 10"        |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
|            | 12"        |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              | ✓              |
| 18"        | 12"        |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
|            | 16"        |   | ◆◆◆           | ∅             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
| 20"        | 12"        |   | ◆◆◆           | ○             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
|            | 16"        |   | ◆◆◆           | ○             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
| 24"        | 16"        |   | ◆◆◆           | ○             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |
|            | 20"        |   | ◆◆◆           | ○             | ✓  | ✓             | ✓                       | ✓                | ✓                | ✓             | ✓              |                |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE-Lined Reducing Cross (ANSI)

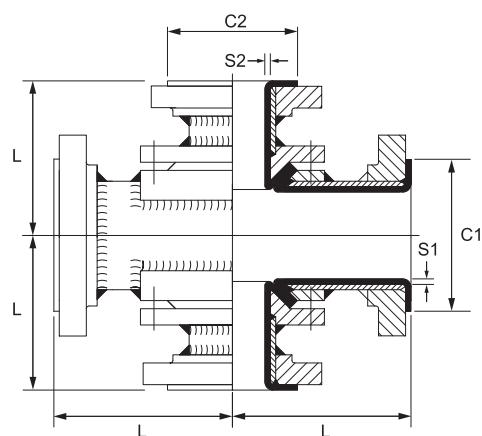
0104

*Welded Steel*

10"-24"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|----------------|----------------|-----------------|
| 10"        | 6"         | 280    | 324            | 216            | 13             | 7.0            | 125             |
|            | 8"         |        |                | 270            |                |                | 130             |
| 12"        | 8"         | 305    | 381            | 270            | 6.5            | 5.0            | 273             |
|            | 10"        |        |                | 324            |                | 5.2            | 280             |
| 14"        | 8"         | 356    | 412            | 270            | 6.5            | 5.0            | 360             |
|            | 12"        |        |                | 381            |                | 6.5            | 375             |
| 16"        | 10"        | 381    | 470            | 324            | 6.5            | 5.2            | 453             |
|            | 12"        |        |                | 381            |                | 6.5            | 461             |
| 18"        | 12"        | 419    | 534            | 381            | 6.5            | 6.5            | 505             |
|            | 16"        |        |                | 470            |                |                | 520             |
| 20"        | 12"        | 457    | 585            | 381            | 6.5            | 6.5            | 515             |
|            | 16"        |        |                | 470            |                |                | 535             |
| 24"        | 16"        | 500    | 692            | 470            | 4.5            | 6.5            | 698             |
|            | 20"        |        |                | 585            |                |                | 720             |



Notes:

- 1..) Vent holes are located on side of tee in center.

For loose stack flange on Select Series,  $L_A = L + 30\text{mm}$   
 \* 24" L dimension is shorter than ANSI B16.5 Class 150 standard

## Part Number System

| 1        | RKR            | 250             | 15                             | W                            | XX              | FF   | 0          | 0XX   |
|----------|----------------|-----------------|--------------------------------|------------------------------|-----------------|--|------------|---|
| Type     | Fitting        | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges  | Series     | Options   |
| Finished | Reducing Cross | Factory Defined | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PFA Lined Instrument Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

1" - 3"



| Major Size | Minor Size | Value Series                                    |           | Select Series  |           |                         |                  |                  |               |
|------------|------------|---|-----------|--|-----------|-------------------------|------------------|------------------|---------------|
|            |            | F x F   | F x F     | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |           |                         |                  |                  |               |
|            |            | Class 150                                       | Class 150 |  |           |                         |                  |                  |               |
|            |            | Value Series<br>Not Available in<br>These Sizes |           |  | Class 300 | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint |
| 1"         | 1/2"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 3/4"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1"         |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
| 1.5"       | 1/2"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 3/4"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1"         |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1.5"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
| 2"         | 1/2"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 3/4"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1"         |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1.5"       |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 2"         |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
| 3"         | 1/2"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 3/4"       |   | ◆◆        | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1"         |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 1.5"       |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |
|            | 2"         |   | ◆         | ●  | ✓         | ✓                       | ✓                |                  |               |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

- |   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |

# PFA Lined Instrument Tee (ANSI)

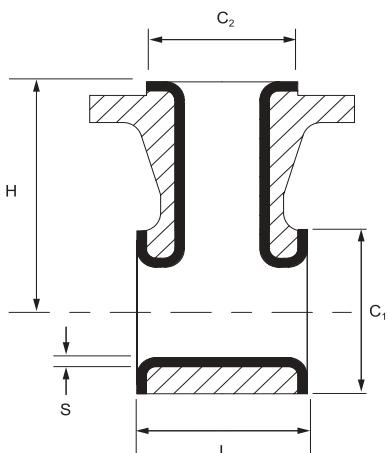
0104

## Welded Steel

1" - 3"

Dimensional Data per Class 150

| Major Size | Minor Size | C <sub>1</sub> | C <sub>2</sub> | Select Series |        |              | Weight (ca. Kg) |
|------------|------------|----------------|----------------|---------------|--------|--------------|-----------------|
|            |            |                |                | L (mm)        | H (mm) | S ± 10% (mm) |                 |
| 1"         | 1/2"       | 60             | 43             | 50            | 90     | 3.5 / 3      | 1.9             |
|            | 3/4"       |                | 52             |               |        | 3.5          | 2               |
|            | 1"         |                | 60             |               |        | 3.5          | 2.2             |
| 1.5"       | 1/2"       | 75             | 43             | 50            | 110    | 4 / 3        | 2.4             |
|            | 3/4"       |                | 52             | 50            | 110    | 4 / 3.5      | 2.6             |
|            | 1"         |                | 60             | 50            | 110    | 4 / 3.5      | 2.8             |
|            | 1.5"       |                | 75             | 75            | 110    | 4            | 4.4             |
| 2"         | 1/2"       | 92             | 43             | 50            | 115    | 4            | 3.2             |
|            | 3/4"       |                | 52             | 50            | 115    | 4            | 3.4             |
|            | 1"         |                | 60             | 50            | 115    | 4            | 3.6             |
|            | 1.5"       |                | 75             | 75            | 115    | 4            | 6.2             |
|            | 2"         |                | 92             | 90            | 115    | 4            | 8.1             |
| 3"         | 1/2"       | 130            | 43             | 50            | 135    | 4.5 / 3      | 4.3             |
|            | 3/4"       |                | 52             | 50            | 135    | 4.5 / 3.5    | 4.5             |
|            | 1"         |                | 60             | 50            | 135    | 4.5 / 3.5    | 4.7             |
|            | 1.5"       |                | 75             | 75            | 135    | 4.5 / 4      | 8.3             |
|            | 2"         |                | 92             | 90            | 135    | 4.5 / 4      | 12.6            |



### Notes:

- 1.) Drawing shows typical Select Series construction

### Part Number System

|          |            |                 |                                |                              |                 |                |            |   |
|----------|------------|-----------------|--------------------------------|------------------------------|-----------------|----------------|------------|---|
| 1        | MST        | XXX             | 15                             | W                            | XX              | 00             | 0          | 0XX   |
| Type     | Fitting    | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges        | Series     | Options   |
| Finished | Instr. Tee | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Inst. Tee | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PFA Lined Instrument Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

4" - 10"



| Major Size | Minor Size | Value Series<br>Not Available in<br>These Sizes | Select Series |  |   |   |                  |               |                |
|------------|------------|---|---------------|--|---|---|------------------|---------------|----------------|
|            |            |   | FF            | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   | Heavy Duty Liner | Special Paint | Earthing Studs |
|            |            |   | Class 150     |  |   |   |                  |               |                |
| 4"         | 1/2"       |   | ◆◆            | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 3/4"       |   | ◆◆            | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 1"         |   | ◆             | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 1.5"       |   | ◆             | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 2"         |   | ◆             | ∅  | ✓ | ✓ | ✓                |               |                |
| 6"         | 1"         |   | ◆             | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 1.5"       |   | ◆             | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 2"         |   | ◆             | ∅  | ✓ | ✓ | ✓                |               |                |
| 8"         | 1"         |   | ◆◆            | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 1.5"       |   | ◆◆            | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 2"         |   | ◆◆            | ∅  | ✓ | ✓ | ✓                |               |                |
| 10"        | 1"         |   | ◆◆◆           | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 1.5"       |   | ◆◆◆           | ∅  | ✓ | ✓ | ✓                |               |                |
|            | 2"         |   | ◆◆◆           | ∅  | ✓ | ✓ | ✓                |               |                |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PFA Lined Instrument Tee (ANSI)

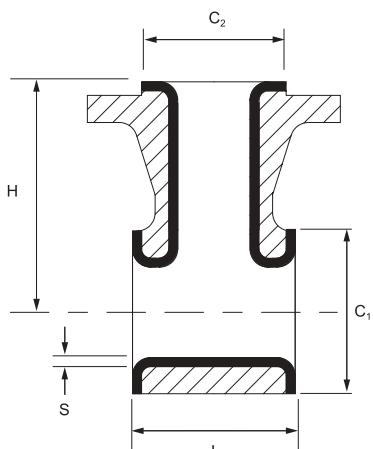
0104

## Welded Steel

4" - 10"

Dimensional Data per Class 150

| Major Size | Minor Size | C <sub>1</sub> | C <sub>2</sub> | Select Series |           |              | Weight (ca. Kg) |
|------------|------------|----------------|----------------|---------------|-----------|--------------|-----------------|
|            |            |                |                | L (mm)        | H (mm)    | S ± 10% (mm) |                 |
| 4"         | 1/2"       | 158            | 43             | 50            | 150       | 4.5 / 3      | 5.5             |
|            | 3/4"       |                | 52             | 50            |           | 4.5 / 3.5    | 5.7             |
|            | 1"         |                | 60             | 50            |           | 4.5 / 3.5    | 5.9             |
|            | 1.5"       | 212            | 75             | 75            | 180       | 4.5 / 4      | 8.9             |
|            | 2"         |                | 92             | 90            |           | 4.5 / 4      | 16              |
| 6"         | 1"         | 212            | 60             | 50            | 4.5 / 3.5 | 8.2          |                 |
|            | 1.5"       |                | 75             | 75            |           | 4.5 / 4      | 14.7            |
|            | 2"         |                | 92             | 90            |           | 4.5 / 4      | 21.8            |
| 8"         | 1"         | 268            | 60             | 50            | 4.5 / 3.5 | 10.5         |                 |
|            | 1.5"       |                | 75             | 75            |           | 4.5 / 4      | 17.8            |
|            | 2"         |                | 92             | 90            |           | 4.5 / 4      | 23.4            |
| 10"        | 1"         | 320            | 60             | 50            | 4.5 / 3.5 | 13.7         |                 |
|            | 1.5"       |                | 75             | 75            |           | 4.5 / 4      | 23.2            |
|            | 2"         |                | 92             | 90            |           | 4.5 / 4      | 25.9            |



Notes:

- 1.) Drawing shows typical Select Series construction

## Part Number System

|          |            |                 |                                |                              |                 |                 |            |  |
|----------|------------|-----------------|--------------------------------|------------------------------|-----------------|-----------------|------------|--|
| 1        | MST        | XXX             | 15                             | W                            | XX              | 00              | 0          | 0XX  |
| Type     | Fitting    | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges         | Series     | Options  |
| Finished | Instr. Tee | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Instr. Tee | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>070 - Stainless Steel |

# PTFE Lined Instrument Tee (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

12" - 24"



| Major Size | Minor Size | Value Series<br>Not Available in<br>These Sizes | Select Series |   |                         |                  |                  |               |                |
|------------|------------|---|---------------|---|-------------------------|------------------|------------------|---------------|----------------|
|            |            |   | F x F         | Options below not available on stock items.<br>Option selection may affect manufacturing<br>lead time. Consult factory for price and<br>delivery. |                         |                  |                  |               |                |
|            |            |   | Class 150     |   |                         |                  |                  |               |                |
|            |            |   |               | Class 300   | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint | Earthing Studs |
| 12"        | 1"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             | Standard       |
|            | 1.5"       | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
|            | 2"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
| 14"        | 1"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             | ✓              |
|            | 1.5"       | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
|            | 2"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
| 16"        | 1"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             | ✓              |
|            | 1.5"       | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
|            | 2"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
| 18"        | 1"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             | ✓              |
|            | 1.5"       | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
|            | 2"         | ◆◆◆   | ◎             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
| 20"        | 1"         | ◆◆◆   | ○             | ✓   | ✓                       | ✓                | ✓                | ✓             | ✓              |
|            | 1.5"       | ◆◆◆   | ○             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
|            | 2"         | ◆◆◆   | ○             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
| 24"        | 1"         | ◆◆◆   | ○             | ✓   | ✓                       | ✓                | ✓                | ✓             | ✓              |
|            | 1.5"       | ◆◆◆   | ○             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |
|            | 2"         | ◆◆◆   | ○             | ✓   | ✓                       | ✓                | ✓                | ✓             |                |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545

|  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)       | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                            |

# PTFE Lined Instrument Tee (ANSI)

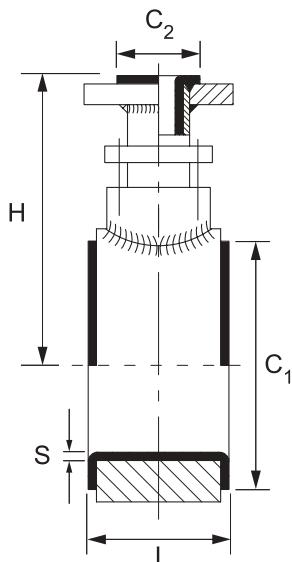
0104

## Welded Steel

12" - 24"

Dimensional Data per Class 150

| Major Size | Minor Size | C <sub>1</sub> | C <sub>2</sub> | Select Series |        |              | Weight (ca. Kg) |
|------------|------------|----------------|----------------|---------------|--------|--------------|-----------------|
|            |            |                |                | L (mm)        | H (mm) | S ± 10% (mm) |                 |
| 12"        | 1"         | 381            | 51             | 90            | 340    | 6.5 / 3      | 43              |
|            | 1.5"       |                | 73             | 110           |        |              | 55.5            |
|            | 2"         |                | 92             | 120           |        |              | 62.1            |
| 14"        | 1"         | 412            | 51             | 90            | 375    | 6.5 / 3      | 53.1            |
|            | 1.5"       |                | 73             | 110           |        |              | 66.5            |
|            | 2"         |                | 92             | 120           |        |              | 73.7            |
| 16"        | 1"         | 470            | 51             | 90            | 390    | 6.5 / 3      | 59.1            |
|            | 1.5"       |                | 73             | 110           |        |              | 74.5            |
|            | 2"         |                | 92             | 120           |        |              | 83.7            |
| 18"        | 1"         | 534            | 51             | 90            | 450    | 6.5 / 3      | 68.5            |
|            | 1.5"       |                | 73             | 110           |        |              | 90.5            |
|            | 2"         |                | 92             | 120           |        |              | 93.7            |
| 20"        | 1"         | 585            | 51             | 90            | 500    | 6.5 / 3      | 72.1            |
|            | 1.5"       |                | 73             | 110           |        |              | 90.5            |
|            | 2"         |                | 92             | 120           |        |              | 100.7           |
| 24"        | 1"         | 692            | 51             | 90            | 510    | 4.5 / 3      | 79.1            |
|            | 1.5"       |                | 73             | 110           |        |              | 94.5            |
|            | 2"         |                | 92             | 120           |        |              | 107.7           |



Notes:

- 1.) Drawing shows typical Select Series construction

## Part Number System

|          |            |                 |                                |                              |                 |                 |            |   |
|----------|------------|-----------------|--------------------------------|------------------------------|-----------------|-----------------|------------|---|
| 1        | MST        | XXX             | 15                             | W                            | XX              | 00              | 0          | 0XX   |
| Type     | Fitting    | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges         | Series     | Options   |
| Finished | Instr. Tee | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Instr. Tee | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Equal Lateral (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series |           | Select Series   |   |   |   |   |   |
|--------------|--------------|-----------|---|---|---|---|---|---|
|              | L x L        | F x F     | <i>Options below not available on stock items.<br/>Option selection may affect manufacturing lead time. Consult factory for price and delivery.</i> |   |   |   |   |   |
|              | Class 150    | Class 150 |   |   |   |   |   |   |
| 1"           | ◆◆           | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 1.5"         | ◆◆           | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 2"           | ◆◆           | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 3"           | ◆◆           | ●         | ◆◆  | ◎ | ✓ | ✓ | ✓ | ✓ |
| 4"           | ◆◆           | ●         | ◆◆  | ◎ | ✓ | ✓ | ✓ | ✓ |
| 6"           | ◆◆           | ●         | ◆◆  | ◎ | ✓ | ✓ | ✓ | ✓ |
| 8"           | ◆◆           | ●         | ◆◆  | ◎ | ✓ | ✓ | ✓ | ✓ |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)        | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                            |

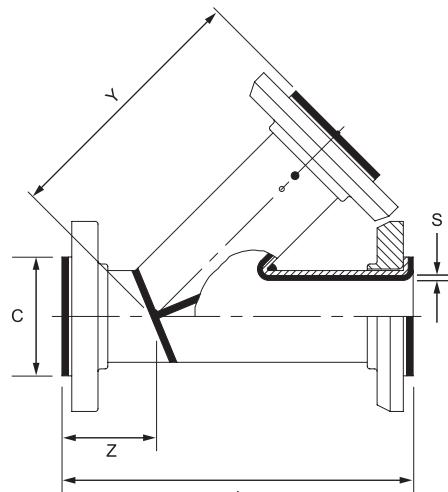
# PTFE Lined Equal Lateral (ANSI)

0104

*Welded Steel*

Dimensional Data per Class 150

| Size | L<br>(mm) | Y<br>(mm) | Z<br>(mm) | C<br>(mm) | S (mm)          |                  | Weight<br>(ca. Kg) |
|------|-----------|-----------|-----------|-----------|-----------------|------------------|--------------------|
|      |           |           |           |           | Value<br>Series | Select<br>Series |                    |
| 1"   | 191       | 146       | 45        | 51        | 5               | 3.5              | 5.2                |
| 1.5" | 229       | 178       | 51        | 73        | 5               | 4.5              | 8.1                |
| 2"   | 267       | 203       | 64        | 92        | 5               | 4.5              | 11.4               |
| 3"   | 330       | 254       | 76        | 127       | 7               | 5                | 24                 |
| 4"   | 381       | 305       | 76        | 157       | 7               | 6                | 44                 |
| 6"   | 457       | 368       | 89        | 216       | 10              | 7                | 65.9               |
| 8"   | 559       | 445       | 114       | 270       | 12              | 10               | 99.5               |



Notes:

- 1.) Drawing shows typical Value Series construction
- 2.) Vent holes are located on side of tee in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

## Part Number System

| 1        | LTE         | 200  | 15                             | W                            | XX              | FF   | 0                       | 0XX   |
|----------|-------------|--|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting     | Diameter   | Pressure                       | Liner                        | Resin Type      | Flanges  | Series                  | Options   |
| Finished | Lateral Tee | 025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6"<br>200 - 8" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Reducing Flange (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



1" - 6"

| Major Size | Minor Size | Value Series<br>Reducing Flanges<br>Not Available | Select Series |  |                         |           |                  |
|------------|------------|---|---------------|--|-------------------------|-----------|------------------|
|            |            |   | Class 150     | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |                         |           |                  |
|            |            |   |               | Class 300 Drilling   | Stainless Steel Housing | Eccentric | Conductive Liner |
| 1"         | 1/2"       | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 3/4"       | ◆◆  | ●             | ✓  | ✓                       |           | ✓                |
| 1 1/2"     | 3/4"       | ◆◆  | ●             | ✓  | ✓                       |           | ✓                |
|            | 1"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
| 2"         | 1"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 1 1/2"     | ◆◆  | ●             | ✓  | ✓                       |           | ✓                |
| 3"         | 1"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 1 1/2"     | ◆◆  | ●             | ✓  | ✓                       |           | ✓                |
|            | 2"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
| 4"         | 1"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 1 1/2"     | ◆◆  | ●             | ✓  | ✓                       |           | ✓                |
|            | 2"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 3"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
| 6"         | 2"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 3"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            | 4"         | ◆◆  | ●             | ✓  | ✓                       | ✓         | ✓                |
|            |            |   |               |  |                         |           |                  |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

|   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ⊖ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |

# PTFE Lined Reducing Flange (ANSI)

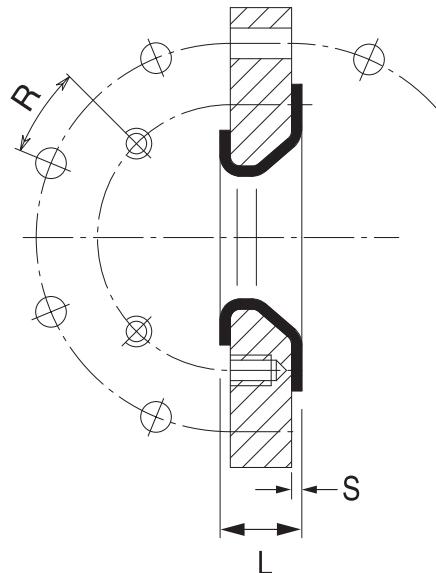
0104

*Carbon Steel*

1" - 6"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) | R     | Bolt Holes | Weight (ca. Kg) |  |
|------------|------------|--------|----------------|----------------|--------------|-------|------------|-----------------|--|
| 1"         | 1/2"       | 35     | 51             | 35             | 3.5          | 45°   | C          | 2.1             |  |
|            | 3/4"       |        |                | 43             |              |       |            | 2.4             |  |
| 1.5"       | 3/4"       | 35     | 73             | 43             | 4            | 45°   | C          | 4               |  |
|            | 1"         |        |                | 51             |              |       |            | 4.1             |  |
| 2"         | 1"         | 35     | 92             | 51             | 4            | 0°    | B          | 4.9             |  |
|            | 1.5"       |        |                | 73             |              | 45°   | C          | 5.1             |  |
| 3"         | 1"         | 35     | 127            | 51             | 4 / 3.5      | 0°    | A          | 6.8             |  |
|            | 1.5"       |        |                | 73             | 4            |       | B          | 6.6             |  |
|            | 2"         |        |                | 92             | 45°          | C     | 6.4        |                 |  |
| 4"         | 1"         | 45     | 158            | 51             | 4.5 / 3.5    | 22.5° | A          | 12              |  |
|            | 1.5"       |        |                | 73             | 4.5 / 4      |       |            | 12              |  |
|            | 2"         |        |                | 92             | A            |       | 12         |                 |  |
|            | 3"         |        |                | 127            | 22.5°        | B     | 10         |                 |  |
| 6"         | 2"         | 45     | 216            | 92             | 5 / 4        | 22.5° | A          | 19              |  |
|            | 3"         |        |                | 127            |              |       | A          | 18              |  |
|            | 4"         |        |                | 158            | 5 / 4.5      | 0°    | B          | 17              |  |



Notes:

- 1.) Vent holes are located on side of reducer in center.

All major size bolt holes straddle the natural centerline.

A - Minor size bolt holes straddle the natural centerline.

B - Major size bolt holes are threaded.

C - Minor size bolt holes are on the natural centerline.

## Part Number System

| 1        | RFK             | XXX             | 15                             | W                            | XX              | 00                  | 0                       | 0XX   |
|----------|-----------------|-----------------|--------------------------------|------------------------------|-----------------|---------------------|-------------------------|---|
| Type     | Fitting         | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges             | Series                  | Options   |
| Finished | Reducing Flange | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Flange Fitting | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Reducing Flange (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



8" - 14"

| Major Size | Minor Size | Value Series<br>Reducing Flanges<br>Not Available | Select Series |  |          |                         |           |
|------------|------------|---|---------------|--|----------|-------------------------|-----------|
|            |            |   | Class 150     | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |          |                         |           |
|            |            |   |               | Class 300*   | Drilling | Stainless Steel Housing | Eccentric |
| 8"         | 2"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 3"         | ◆◆  | ∅             | ✓  | ✓        | ✓                       | ✓         |
|            | 4"         | ◆◆  | ∅             | ✓  | ✓        | ✓                       | ✓         |
| 10"        | 3"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 4"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 6"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 8"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
| 12"        | 6"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 8"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 10"        | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
| 14"        | 8"         | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 10"        | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |
|            | 12"        | ◆◆  | ∅             | ✓  | ✓        |                         | ✓         |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Lined Reducing Flange (ANSI)

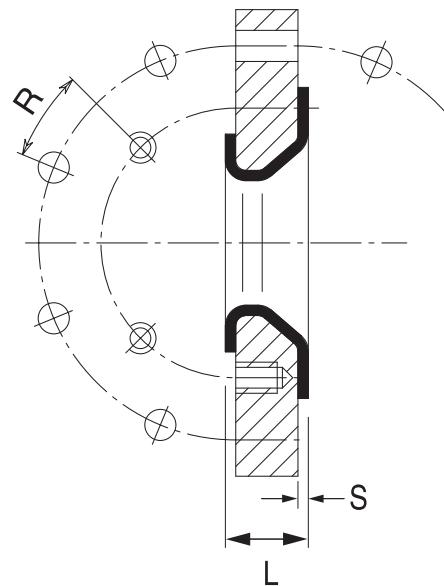
0104

*Carbon Steel*

8" - 14"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) | R     | Bolt Holes | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|--------------|-------|------------|-----------------|
| 8"         | 2"         | 45     | 270            | 92             | 5 / 4        | 22.5° | A          | 28              |
|            | 3"         |        |                | 127            |              |       |            | 27              |
|            | 4"         |        |                | 158            | 5 / 4.5      | 0°    |            | 25              |
| 10"        | 3"         | 45     | 324            | 127            | 6 / 4        | 0°    | A          | 24              |
|            | 4"         |        |                | 158            |              |       |            | 22              |
|            | 6"         |        |                | 216            | 5            | 7.5°  |            | 19              |
|            | 8"         |        |                | 270            |              | B     | 16         |                 |
| 12"        | 6"         | 50     | 381            | 216            | 6 / 4        | 7.5°  | A          | 31              |
|            | 8"         |        |                | 270            |              |       |            | 28              |
|            | 10"        |        |                | 324            | 5.5          | 0°    | B          | 24              |
| 14"        | 8"         | 50     | 412            | 270            | 6 / 4        | 7.5°  | A          | 38              |
|            | 10"        |        |                | 324            | 6            | 0°    |            | 35              |
|            | 12"        |        |                | 381            |              | 15°   | C          | 33              |



All major size bolt holes straddle the natural centerline.

A - Minor size bolt holes straddle the natural centerline.

B - Major size bolt holes are threaded.

C - Minor size bolt holes are on the natural centerline.

## Part Number System

| 1    | RFK     | XXX      | 15       | W     | XX         | 00      | 0      | 0XX     |
|------|---------|----------|----------|-------|------------|---------|--------|---------|
| Type | Fitting | Diameter | Pressure | Liner | Resin Type | Flanges | Series | Options |

Legend for Options:

- 0XX - Standard
- 052 - Earthing Stud
- 054 - Vent Boss
- 070 - Stainless Steel

Example values for the table cells:

|          |                 |                 |                                |                              |                 |                     |                         |   |
|----------|-----------------|-----------------|--------------------------------|------------------------------|-----------------|---------------------|-------------------------|---|
| Finished | Reducing Flange | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Flange Fitting | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |
|----------|-----------------|-----------------|--------------------------------|------------------------------|-----------------|---------------------|-------------------------|---|

# PTFE Lined Reducing Flange (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



16" - 24"

| Major Size | Minor Size | Value Series<br>Reducing Flanges<br>Not Available | Select Series |  |          |                         |           |                  |                  |
|------------|------------|---|---------------|--|----------|-------------------------|-----------|------------------|------------------|
|            |            |   | Class 150     | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |          |                         |           |                  |                  |
|            |            |   |               | Class 300*   | Drilling | Stainless Steel Housing | Eccentric | Conductive Liner | Heavy Duty Liner |
| 16"        | 10"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 12"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 14"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
| 18"        | 12"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 14"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 16"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
| 20"        | 12"        | ◆◆◆   | ∅             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 14"        | ◆◆◆   | ○             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 16"        | ◆◆◆   | ○             | ✓  | ✓        |                         |           | ✓                |                  |
| 24"        | 12"        | ◆◆◆   | ○             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 14"        | ◆◆◆   | ○             | ✓  | ✓        |                         |           | ✓                |                  |
|            | 16"        | ◆◆◆   | ○             | ✓  | ✓        |                         |           | ✓                |                  |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

- |  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                            |

# PTFE Lined Reducing Flange (ANSI)

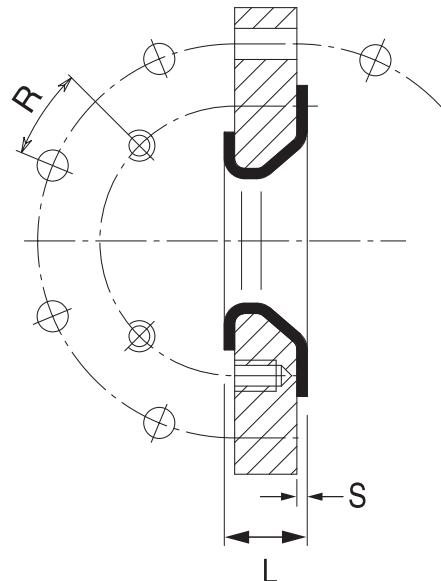
0104

*Carbon Steel*

16" - 24"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) | R     | Bolt Holes | Weight (ca. Kg) |  |
|------------|------------|--------|----------------|----------------|--------------|-------|------------|-----------------|--|
| 16"        | 10"        | 50     | 470            | 324            | 6 / 4        | 3.75° | A          | 55              |  |
|            | 12"        |        |                | 381            | 6            |       | B          | 49              |  |
|            | 14"        |        |                | 412            |              |       | C          | 40              |  |
| 18"        | 12"        | 50     | 534            | 381            | 6 / 4        | 3.75° | A          | 58              |  |
|            | 14"        |        |                | 412            | 6            |       | B          | 49              |  |
|            | 16"        |        |                | 470            |              |       | C          | 44              |  |
| 20"        | 12"        | 50     | 585            | 381            | 6 / 4        | 6°    | A          | 77              |  |
|            | 14"        |        |                | 412            |              |       | B          | 70              |  |
|            | 16"        |        |                | 470            |              |       | C          | 62              |  |
| 24"        | 12"        | 50     | 692            | 381            | 6 / 4        | 6°    | A          | 121             |  |
|            | 14"        |        |                | 412            |              |       | B          | 105             |  |
|            | 16"        |        |                | 470            |              |       | C          | 93              |  |



All major size bolt holes straddle the natural centerline.

A - Minor size bolt holes straddle the natural centerline.

B - Major size bolt holes are threaded.

C - Minor size bolt holes are on the natural centerline.

## Part Number System

| 1        | RFK             | XXX             | 15                             | W                            | XX              | 00                  | 0                       | 0XX   |
|----------|-----------------|-----------------|--------------------------------|------------------------------|-----------------|---------------------|-------------------------|---|
| Type     | Fitting         | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges             | Series                  | Options   |
| Finished | Reducing Flange | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Flange Fitting | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Concentric Reducer (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

3/4" - 6"



| Major Size | Minor Size | Value Series                  |   | Select Series |   |   |               |                         |                  |                  |   |
|------------|------------|-------------------------------|---|---------------|---|---|---------------|-------------------------|------------------|------------------|---|
|            |            | 1" - 4" = F x L<br>6" = F x F |   | F x F         |   | Options below not available on stock items.<br>Option selection may affect manufacturing lead time. Consult factory for price and delivery. |               |                         |                  |                  |   |
|            |            | Class 150                     |   | Class 150     |   |   |               |                         |                  |                  |   |
|            |            |                               |   |               |   | Class 300   | Loose Flanges | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner |   |
| 3/4"       | 1/2"       | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
| 1"         | 1/2"       | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
|            | 3/4"       | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
| 1.5"       | 3/4"       | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
|            | 1"         | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
| 2"         | 1"         | ◆                             | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
|            | 1.5"       | ◆                             | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                |                  |   |
| 3"         | 1"         | ◆                             | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
|            | 1.5"       | ◆                             | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
| 4"         | 2"         | ◆                             | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
|            | 3"         | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
| 6"         | 1"         | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
|            | 2"         | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
|            | 3"         | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |
|            | 4"         | ◆◆                            | ● | ✓             | ✓ | ✓   | ✓             | ✓                       | ✓                | ✓                | ✓ |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Lined Concentric Reducer (ANSI)

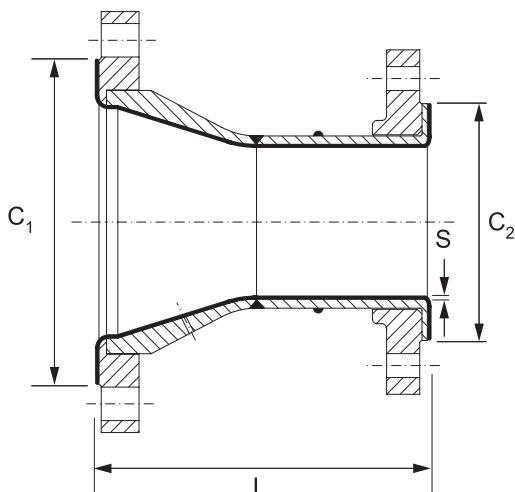
0104

*Welded Steel*

3/4" - 6"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) |               | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|--------------|---------------|-----------------|
|            |            |        |                |                | Value Series | Select Series |                 |
| 3/4"       | 1/2"       | 114    | 43             | 35             |              | 2             | 2.1             |
| 1"         | 1/2"       | 114    | 51             | 35             |              | 3             | 2.4             |
|            | 3/4"       |        |                | 43             |              |               | 2.4             |
| 1.5"       | 3/4"       | 114    | 73             | 43             | 2.9          | 3             | 3.1             |
|            | 1"         |        |                | 51             |              | 3             | 3.3             |
| 2"         | 1"         | 127    | 92             | 51             | 2.9          | 4 / 3         | 4.1             |
|            | 1.5"       |        |                | 73             |              |               | 5               |
| 3"         | 1"         | 152    | 127            | 51             | 3.9          | 4 / 3         | 6.7             |
|            | 1.5"       |        |                | 73             |              |               | 6.9             |
|            | 2"         |        |                | 92             |              | 4             | 7.8             |
| 4"         | 1"         | 178    | 158            | 51             | 3.9          | 4.5 / 3       | 10.2            |
|            | 1.5"       |        |                | 73             |              |               | 11.4            |
|            | 2"         |        |                | 92             |              | 4.5 / 4       | 12.3            |
|            | 3"         |        |                | 127            |              |               | 4.5             |
| 6"         | 1"         | 229    | 216            | 51             | 4.2          | 5 / 3         | 19              |
|            | 2"         |        |                | 92             |              | 5 / 4         | 20              |
|            | 3"         |        |                | 127            |              | 5 / 4         | 20              |
|            | 4"         |        |                | 158            |              | 5 / 4.5       | 23.7            |



Notes:

- 1.) Drawing shows typical Value Series construction.
- 2.) Vent holes are located on side of reducer in center.
- 3.) Weld buttons are located approximately 25mm behind each flange.

## Part Number System

| 1        | RSK           | XXX             | 15                             | W                            | XX              | FF   | 0                       | 0XX   |
|----------|---------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting       | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges  | Series                  | Options   |
| Finished | Conc. Reducer | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Concentric Reducer (ANSI)

ASTM F1545  
CE, Cat. III (>1")  
TEFLON® by DuPont

8" - 24"



| Major Size | Minor Size | Value Series                   |           | Select Series |   |   |   |   |   |  |  |
|------------|------------|--------------------------------|-----------|---------------|---|---|---|---|---|--|--|
|            |            | 8" = F x L<br>10", 12" = F x F |           | F x F         |   | Options below not available on stock items.<br>Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   |   |  |  |
|            |            | Class 150                      | Class 150 |               |   |   |   |   |   |  |  |
| 8"         | 4"         | ◆◆                             | ●         | ◆◆            | ◎ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 6"         | ◆◆                             | ●         | ◆◆            | ◎ | ✓   | ✓ | ✓ | ✓ |  |  |
| 10"        | 6"         | ◆◆                             | ◎         | ◆◆◆           | ◎ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 8"         | ◆◆                             | ●         | ◆◆◆           | ◎ | ✓   | ✓ | ✓ | ✓ |  |  |
| 12"        | 6"         | ◆◆                             | ●         | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 8"         | ◆◆                             | ●         | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 10"        | ◆◆                             | ●         | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
| 14"        | 10"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 12"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
| 16"        | 12"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 14"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
| 18"        | 14"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 16"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
| 20"        | 16"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
|            | 18"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |
| 24"        | 20"        |                                |           | ◆◆◆           | ○ | ✓   | ✓ | ✓ | ✓ |  |  |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Lined Concentric Reducer (ANSI)

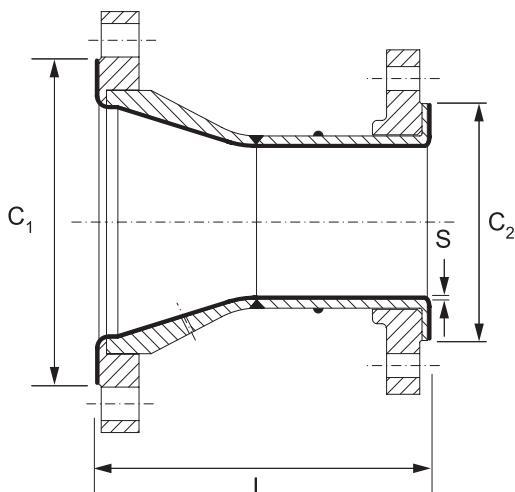
0104

*Welded Steel*

8" - 24"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) |               | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|--------------|---------------|-----------------|
|            |            |        |                |                | Value Series | Select Series |                 |
| 8"         | 4"         | 279    | 270            | 158            | 4.4          | 6 / 4.5       | 22.1            |
|            | 6"         |        |                | 216            |              | 6 / 5         | 25.2            |
| 10"        | 6"         | 305    | 324            | 216            | 4.4          | 6.5 / 5       | 37.8            |
|            | 8"         |        |                | 270            | 12.7         | 6.5           | 44.8            |
| 12"        | 6"         | 356    | 381            | 216            | 12.7         | 6.5           | 46              |
|            | 8"         |        |                | 270            |              | 6.5           | 48              |
|            | 10"        |        |                | 324            |              |               | 52.6            |
| 14"        | 10"        | 406    | 412            | 324            | 6.5          | 73.6          |                 |
|            | 12"        |        |                | 381            |              | 80            |                 |
| 16"        | 12"        | 457    | 470            | 381            | 6.5          | 105           |                 |
|            | 14"        |        |                | 412            |              | 115           |                 |
| 18"        | 14"        | 483    | 534            | 412            | 6.5          | 148           |                 |
|            | 16"        |        |                | 470            |              | 157           |                 |
| 20"        | 16"        | 508    | 585            | 470            | 6.5          | 210           |                 |
|            | 18"        |        |                | 534            |              | 218           |                 |
| 24"        | 18"        | 610    | 692            | 534            | 4.5          | 282           |                 |
|            | 20"        |        |                | 585            |              | 291           |                 |



Notes:

- 1.) Drawing shows typical Value Series construction.
- 2.) Vent holes are located in center of reducer.
- 3.) Weld buttons are located approximately 25mm behind each flange.

## Part Number System

| 1        | RSK           | XXX             | 15                             | W                            | XX              | FF   | 0                       | 0XX   |
|----------|---------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting       | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges  | Series                  | Options   |
| Finished | Conc. Reducer | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Eccentric Reducer (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

1" - 6"



| Major Size | Minor Size | Value Series |           | Select Series   |   |   |   |   |   |
|------------|------------|--------------|-----------|---|---|---|---|---|---|
|            |            | F x F        | F x F     | Options below not available on stock items.<br>Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   |   |   |   |
|            |            | Class 150    | Class 150 |   |   |   |   |   |   |
| 1"         | 1/2"       |              |           | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
|            | 3/4"       |              |           | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 1.5"       | 3/4"       |              |           | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 2"         | 1"         | ◆◆           | ●         | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 3"         | 2"         | ◆◆           | ● ■       | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
|            | 2.5"       |              |           | ◆◆  | ● | ✓ | ✓ | ✓ | ✓ |
| 4"         | 1.5"       |              |           | ◆◆  | ∅ | ✓ | ✓ | ✓ | ✓ |
|            | 2"         | ◆◆           | ● ■       | ◆◆  | ∅ | ✓ | ✓ | ✓ | ✓ |
|            | 3"         | ◆◆           | ● ■       | ◆◆  | ∅ | ✓ | ✓ | ✓ | ✓ |
| 6"         | 3"         | ◆◆           | ● ■       | ◆◆  | ∅ | ✓ | ✓ | ✓ | ✓ |

\* Class 300 subject to CE approval

† These options also available in Value Series  
Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

- |   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |
|   | ■ Ductile Iron Body - Fixed Flanges           |

# PTFE Lined Eccentric Reducer (ANSI)

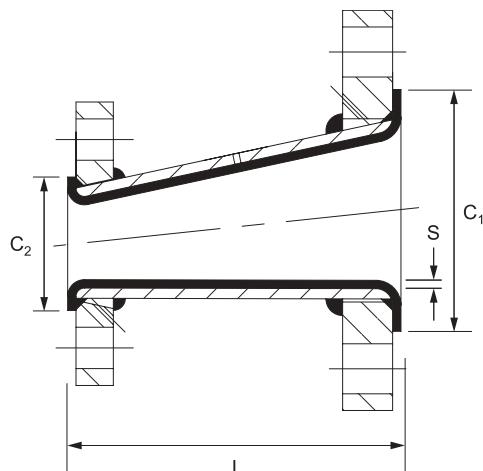
0104

## Welded Steel

1" - 6"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) |               | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|--------------|---------------|-----------------|
|            |            |        |                |                | Value Series | Select Series |                 |
| 1"         | 1/2"       | 114    | 51             | 35             | 2.5          | 2.4           | 2.4             |
|            | 3/4"       |        |                | 43             |              | 2.4           |                 |
| 1.5"       | 3/4"       | 114    | 73             | 43             |              | 3             | 3.1             |
| 2"         | 1"         | 127    | 92             | 51             | 3            | 4 / 3         | 4.1             |
| 3"         | 2"         | 152    | 127            | 92             | 3            | 4             | 6.9             |
|            | 2.5        |        |                | 105            |              | 4             | 7.8             |
| 4"         | 1.5"       | 178    | 158            | 73             |              | 5.5 / 4.5     | 11.4            |
|            | 2"         |        |                | 92             | 5            | 4.5 / 3       | 12.3            |
|            | 3"         |        |                | 127            | 3            | 4             | 15              |
| 6"         | 3"         | 229    | 216            | 127            | 4            | 5 / 4         | 20              |



### Notes:

- 1.) Vent holes are located on side of reducer in center.
- 2.) Weld buttons are located approximately 25mm behind each flange.

### Part Number System

| 1        | RSE           | XXX             | 15                             | W                            | XX              | FF   | 0                       | 0XX   |
|----------|---------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Type     | Fitting       | Diameter        | Pressure                       | Liner                        | Resin Type      | Flanges  | Series                  | Options   |
| Finished | Conc. Reducer | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Eccentric Reducer (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont

8" - 20"



| Major Size | Minor Size | Value Series |           | Select Series   |   |   |   |  |   |
|------------|------------|--------------|-----------|---|---|---|---|--|---|
|            |            | F x F        | F x F     | Options below not available on stock items.<br>Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   |   |  |   |
|            |            | Class 150    | Class 150 |   |   |   |   |  |   |
|            |            |              |           |   |   |   |   |  |   |
| 10"        | 6"         | ◆◆           | ● ■       | ✓   | ✓ | ✓ | ✓ |  |   |
|            | 6"         | ◆◆◆          | ∅         | ✓   | ✓ | ✓ | ✓ |  |   |
|            | 8"         | ◆◆◆          | ∅         | ✓   | ✓ | ✓ | ✓ |  |   |
| 12"        | 6"         | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  |   |
|            | 8"         | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  |   |
|            | 10"        | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  |   |
| 14"        | 10"        | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  | ✓ |
| 16"        | 12"        | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  | ✓ |
| 18"        | 16"        | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  | ✓ |
| 20"        | 16"        | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  | ✓ |
|            | 18"        | ◆◆◆          | ○         | ✓   | ✓ | ✓ | ✓ |  |   |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

- |   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |
|   | ■ Ductile Iron Body - Fixed Flanges           |

# PTFE Lined Eccentric Reducer (ANSI)

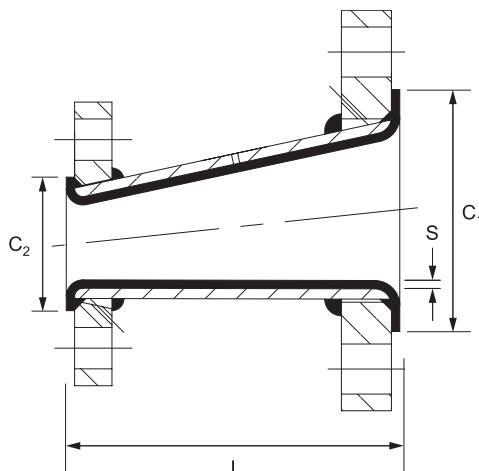
0104

*Welded Steel*

8"-20"

Dimensional Data per Class 150

| Major Size | Minor Size | L (mm) | C <sub>1</sub> | C <sub>2</sub> | S ± 10% (mm) |               | Weight (ca. Kg) |
|------------|------------|--------|----------------|----------------|--------------|---------------|-----------------|
|            |            |        |                |                | Value Series | Select Series |                 |
| 8"         | 6"         | 279    | 270            | 216            | 7.5          | 6 / 5         | 25.1            |
| 10"        | 6"         | 305    | 324            | 216            |              | 6 / 5         | 37.8            |
|            | 8"         |        |                | 270            |              | 10            | 44.8            |
| 12"        | 6"         | 356    | 381            | 216            | 6.5 / 5      | 46            |                 |
|            | 8"         |        |                | 270            |              | 48            |                 |
|            | 10"        |        |                | 324            |              | 6             | 52.6            |
| 14"        | 10"        | 406    | 412            | 324            |              | 6             | 73.6            |
| 16"        | 10"        | 457    | 470            | 324            |              | 6             | 97              |
|            | 12"        |        |                | 381            |              | 6.5           | 105             |
| 18"        | 16"        | 483    | 534            | 470            |              | 6             | 157             |
| 20"        | 16"        | 508    | 585            | 470            |              | 6             | 210             |
|            | 18"        |        |                | 534            |              |               | 218             |



Notes:

- 1.) Drawing shows typical Value Series construction.
- 2.) Vent holes are located on side of reducer in center.

## Part Number System

| 1    | RSE     | XXX      | 15       | W     | XX         | FF      | 0      | 0XX     |
|------|---------|----------|----------|-------|------------|---------|--------|---------|
| Type | Fitting | Diameter | Pressure | Liner | Resin Type | Flanges | Series | Options |

|          |               |                 |                                |                              |                 |  |                         |   |
|----------|---------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|
| Finished | Conc. Reducer | Consult Factory | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | FF - Fixed/Fixed<br>FL - Fixed/Loose<br>LL - Loose/Loose | 1 - Value<br>0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |
|----------|---------------|-----------------|--------------------------------|------------------------------|-----------------|--|-------------------------|---|

# PTFE Solid Spacer (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series<br>Spacers<br>Not Available | Select Series |   | Option selection<br>may affect<br>manufacturing<br>lead time.<br>Consult factory for<br>price and delivery. |
|--------------|--|---------------|---|---|
|              |  |               |   |   |
| 1/2"         |  | ◆◆            | ● |   |
| 3/4"         |  | ◆◆            | ● |   |
| 1"           |  | ◆◆            | ● |   |
| 1.5"         |  | ◆◆            | ● |   |
| 2"           |  | ◆◆            | ● |   |
| 3"           |  | ◆◆            | ● |   |
| 4"           |  | ◆◆            | ● |   |
| 6"           |  | ◆◆            | ● |   |
| 8"           |  | ◆◆            | ● | ✓   |
| 10"          |  | ◆◆◆           | ● |   |
| 12"          |  | ◆◆◆           | ● |   |
| 14"          |  | ◆◆◆           | ● |   |
| 16"          |  | ◆◆◆           | ● |   |
| 18"          |  | ◆◆◆           | ● |   |
| 20"          |  | ◆◆◆           | ● |   |
| 24"          |  | ◆◆◆           | ● |   |

Some Select Series items use components not listed in ASTM F1545.

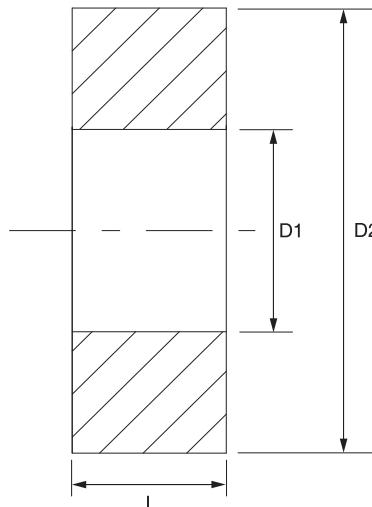
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Solid Spacer (ANSI)

0104

## Dimensional Data

| Size | Max. L<br>(mm) | D1<br>(mm) | D2<br>(mm) | Weight<br>(ca. Kg) |
|------|----------------|------------|------------|--------------------|
| 1/2" | 20             | 14         | 35         | 0.1                |
| 3/4" | 20             | 16         | 43         | 0.1                |
| 1"   | 20             | 22         | 51         | 0.2                |
| 1.5" | 20             | 37         | 73         | 0.3                |
| 2"   | 20             | 48         | 92         | 0.4                |
| 3"   | 25             | 76         | 127        | 0.6                |
| 4"   | 25             | 101        | 158        | 0.75               |
| 6"   | 30             | 153        | 216        | 1.4                |
| 8"   | 30             | 201        | 270        | 2.0                |
| 10"  | 40             | 254        | 324        | 3.2                |
| 12"  | 40             | 303        | 381        | 4.0                |
| 14"  | 40             | 333        | 412        | 4.5                |
| 16"  | 40             | 382        | 470        | 5.2                |
| 18"  | 40             | 430        | 534        | 6.1                |
| 20"  | 40             | 480        | 585        | 7.2                |
| 24"  | 40             | 590        | 692        | 8.5                |



## Part Number System

| 1        | DSF     | 250  | 00  | W           | XX         | 00              | 0           | 0XX                          |
|----------|---------|--|---|-------------|------------|-----------------|-------------|------------------------------|
| Type     | Fitting | Diameter   | Pressure  | Liner       | Resin Type | Flanges         | Series      | Options                      |
| Finished | Spacer  | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 00 - Spacer | W - White  | Factory Defined | 00 - Spacer | 0 - Select<br>0XX - Standard |

# PTFE Armored Spacer (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series<br>Spacers<br>Not Available | Select Series |   | Option selection<br>may affect<br>manufacturing<br>lead time.<br>Consult factory for<br>price and delivery. |
|--------------|--|---------------|---|---|
|              |  |               |   |   |
| 1/2"         |  | ◆◆            | ● |   |
| 3/4"         |  | ◆◆            | ● |   |
| 1"           |  | ◆◆            | ● |   |
| 1.5"         |  | ◆◆            | ● |   |
| 2"           |  | ◆◆            | ● |   |
| 3"           |  | ◆◆            | ● |   |
| 4"           |  | ◆◆            | ● |   |
| 6"           |  | ◆◆            | ● |   |
| 8"           |  | ◆◆            | ● | ✓   |
| 10"          |  | ◆◆◆           | ● |   |
| 12"          |  | ◆◆◆           | ● |   |
| 14"          |  | ◆◆◆           | ● |   |
| 16"          |  | ◆◆◆           | ● |   |
| 18"          |  | ◆◆◆           | ● |   |
| 20"          |  | ◆◆◆           | ● |   |
| 24"          |  | ◆◆◆           | ● |   |

Some Select Series items use components not listed in ASTM F1545.

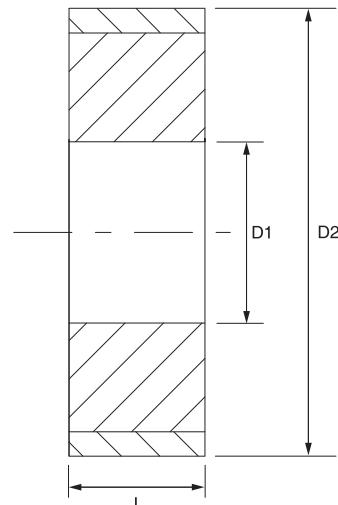
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Armored Spacer (ANSI)

0104

## Dimensional Data

| Size | Max. L (mm) | S (mm) | D1 (mm) | D2 (mm) | Weight (ca. Kg) |
|------|-------------|--------|---------|---------|-----------------|
| 1/2" | 20          | 2      | 14      | 33.7    | 0.1             |
| 3/4" | 20          | 2.3    | 16      | 42.4    | 0.1             |
| 1"   | 20          | 2.3    | 22      | 54      | 0.2             |
| 1.5" | 20          | 2.6    | 37      | 73      | 0.3             |
| 2"   | 20          | 2.9    | 48      | 101.6   | 0.4             |
| 3"   | 25          | 3.2    | 76      | 127     | 0.6             |
| 4"   | 25          | 4      | 101     | 159     | 0.75            |
| 6"   | 30          | 4.5    | 153     | 219.1   | 1.4             |
| 8"   | 30          | 5      | 201     | 273     | 2.0             |
| 10"  | 40          | 5.6    | 254     | 323.9   | 3.2             |
| 12"  | 40          | 5      | 303     | 381     | 4.0             |
| 14"  | 40          | 6.3    | 333     | 406.4   | 4.5             |
| 16"  | 40          | 6      | 382     | 470     | 5.2             |
| 18"  | 40          | 6      | 430     | 534     | 6.1             |
| 20"  | 40          | 6      | 480     | 585     | 7.2             |
| 24"  | 40          | 6      | 590     | 692     | 8.5             |



## Part Number System

| 1        | DSX            | 250  | 00  | W           | XX         | 00              | 0           | 0XX        |                |
|----------|----------------|--|---|-------------|------------|-----------------|-------------|------------|----------------|
| Type     | Fitting        | Diameter   | Pressure  | Liner       | Resin Type | Flanges         | Series      | Options    |                |
| Finished | Armored Spacer | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 00 - Spacer | W - White  | Factory Defined | 00 - Spacer | 0 - Select | 0XX - Standard |

# PTFE Lined Ring Spacer (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series   | Select Series |   |  |                         |                  |                  |               |
|--------------|--|---------------|---|--|-------------------------|------------------|------------------|---------------|
|              |  | F x F         |   | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |                         |                  |                  |               |
|              |  | Class 150     |   | Class 300*   | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint |
|              | Lined Ring Spacers<br>Not Available in<br>Value Series |               |   |  |                         |                  |                  |               |
| 1/2"         |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 3/4"         |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 1"           |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 1 1/2"       |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 2"           |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 3"           |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 4"           |  | ◆◆            | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 6"           |  | ◆◆            | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 8"           |  | ◆◆            | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 10"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 12"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 14"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 16"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 18"          |  | ◆◆◆           | ○ | ✓  | ✓                       | ✓                |                  |               |
| 20"          |  | ◆◆◆           | ○ | ✓  | ✓                       | ✓                |                  |               |
| 24"          |  | ◆◆◆           | ○ | ✓  | ✓                       | ✓                |                  |               |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

|  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)        | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                            |

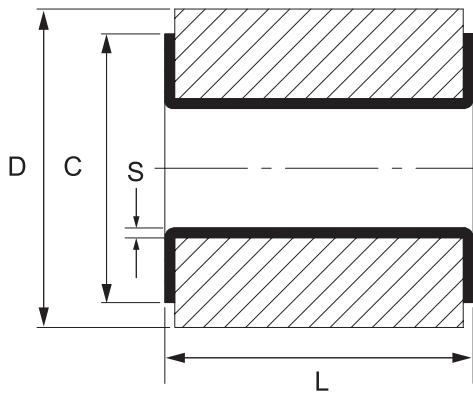
# PTFE Lined Ring Spacer (ANSI)

0104

*Carbon Steel*

Dimensional Data per Class 150

| Size | Min. L (mm) | Max. L (mm) | S (mm) | C (mm) | D (mm) | Weight (ca Kg / m) |
|------|-------------|-------------|--------|--------|--------|--------------------|
| 1/2" | 20          | 115         | 2.5    | 35     | 44     | 0.9                |
| 3/4" | 20          | 130         | 3      | 43     | 53     | 1.2                |
| 1"   | 20          | 140         | 3      | 51     | 63     | 1.8                |
| 1.5" | 20          | 150         | 3      | 73     | 82     | 2.6                |
| 2"   | 20          | 155         | 3      | 92     | 100    | 3.7                |
| 3"   | 25          | 185         | 3.5    | 127    | 133    | 5.3                |
| 4"   | 25          | 200         | 4.5    | 158    | 170    | 9.5                |
| 6"   | 30          | 235         | 5      | 216    | 218    | 14                 |
| 8"   | 30          | 265         | 6.25   | 270    | 276    | 18                 |
| 10"  | 40          | 270         | 6.75   | 324    | 336    | 29                 |
| 12"  | 40          | 285         | 8      | 381    | 406    | 30                 |
| 14"  | 40          | 320         | 9      | 412    | 447    | 50                 |
| 16"  | 40          | 325         | 10     | 470    | 510    | 60                 |
| 18"  | 40          | 340         | 7.5    | 534    | 545    | 71                 |
| 20"  | 60          | 365         | 6.5    | 585    | 602    | 75                 |
| 24"  | 60          | 375         | 4.5    | 692    | 714    | 113                |



Notes:

1.) Drawing shows typical Select Series construction

## Part Number System

| 1        | DSG               | 250  | 15  | W                              | XX                           | 00              | 0           | 0XX        |   |
|----------|-------------------|--|---|--------------------------------|------------------------------|-----------------|-------------|------------|---|
| Type     | Fitting           | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series      | Options    |   |
| Finished | Lined Ring Spacer | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Spacer | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Distance Piece (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series<br><br>Distance<br>Pieces<br>Not Available<br>In Value Series | Select Series |   |  |                         |                  |                  |               |
|--------------|--|---------------|---|--|-------------------------|------------------|------------------|---------------|
|              |  | F x F         |   | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |                         |                  |                  |               |
|              |  | Class 150     |   | Class 300*   | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint |
| 1/2"         |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 3/4"         |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 1"           |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 1 1/2"       |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 2"           |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 3"           |  | ◆◆            | ● | ✓  | ✓                       | ✓                |                  |               |
| 4"           |  | ◆◆            | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 6"           |  | ◆◆            | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 8"           |  | ◆◆            | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 10"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 12"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 14"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 16"          |  | ◆◆◆           | ◎ | ✓  | ✓                       | ✓                |                  |               |
| 18"          |  | ◆◆◆           | ○ | ✓  | ✓                       | ✓                |                  |               |
| 20"          |  | ◆◆◆           | ○ | ✓  | ✓                       | ✓                |                  |               |
| 24"          |  | ◆◆◆           | ○ | ✓  | ✓                       | ✓                |                  |               |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

- |   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

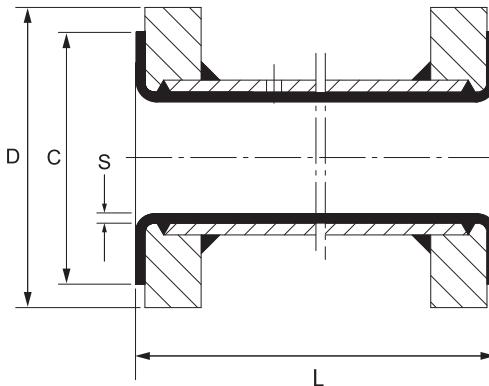
# PTFE Lined Distance Piece (ANSI)

0104

## Welded Steel

Dimensional Data per Class 150

| Size | Min. L (mm) | Max. L (mm) | S (mm) | C (mm) | D (mm) | Weight 2 Collars (ca Kg) | Weight Pipe (ca Kg / m) |
|------|-------------|-------------|--------|--------|--------|--------------------------|-------------------------|
| 1/2" | 60          | 115         | 2.5    | 35     | 44     | 0.9                      | 1.2                     |
| 3/4" | 60          | 130         | 3      | 43     | 53     | 1.2                      | 1.6                     |
| 1"   | 60          | 140         | 3      | 51     | 63     | 1.8                      | 2.5                     |
| 1.5" | 60          | 150         | 3      | 73     | 82     | 2.6                      | 4.5                     |
| 2"   | 60          | 155         | 3      | 92     | 100    | 3.7                      | 5.8                     |
| 3"   | 70          | 185         | 3.5    | 127    | 133    | 5.3                      | 10                      |
| 4"   | 80          | 200         | 4.5    | 158    | 170    | 9.5                      | 14                      |
| 6"   | 80          | 235         | 5      | 216    | 218    | 14                       | 23.5                    |
| 8"   | 80          | 265         | 6.25   | 270    | 276    | 18                       | 39                      |
| 10"  | 80          | 270         | 6.75   | 324    | 336    | 29                       | 55.5                    |
| 12"  | 90          | 285         | 8      | 381    | 406    | 30                       | 74                      |
| 14"  | 90          | 320         | 9      | 412    | 447    | 50                       | 85                      |
| 16"  | 90          | 325         | 10     | 470    | 510    | 60                       | 102                     |
| 18"  | 100         | 340         | 7.5    | 534    | 545    | 71                       | 130                     |
| 20"  | 100         | 365         | 6.5    | 585    | 602    | 75                       | 155                     |
| 24"  | 120         | 375         | 4.5    | 692    | 714    | 113                      | 204                     |



Notes:

- 1.) Drawing shows typical Select Series construction

## Part Number System

|          |                   |  |   |                                |                              |                 |             |            |   |
|----------|-------------------|--|---|--------------------------------|------------------------------|-----------------|-------------|------------|---|
| 1        | DSH               | 250  | 15  | W                              | XX                           | 00              | 0           | 0XX        |   |
| Type     | Fitting           | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series      | Options    |   |
| Finished | Lined Ring Spacer | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Spacer | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Spectacle Blind (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series<br>Spectacle Blind<br>Not Available | Class 150 | Select Series |                         |                  |                  |               |
|--------------|--|-----------|---------------|-------------------------|------------------|------------------|---------------|
|              |  |           | Class 300*    | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint |
| 1/2"         |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 3/4"         |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 1"           |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 1.5"         |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 2"           |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 3"           |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 4"           |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 6"           |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 8"           |  | ◆◆ ◎      | ✓             | ✓                       | ✓                |                  |               |
| 10"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |
| 12"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |
| 14"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |
| 16"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |
| 18"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |
| 20"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |
| 24"          |  | ◆◆◆ ◎     | ✓             | ✓                       | ✓                |                  |               |

\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545

|  |   |
|--|---|
| ◆◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)        | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request      | ○ Non-Vacuum Rated                            |

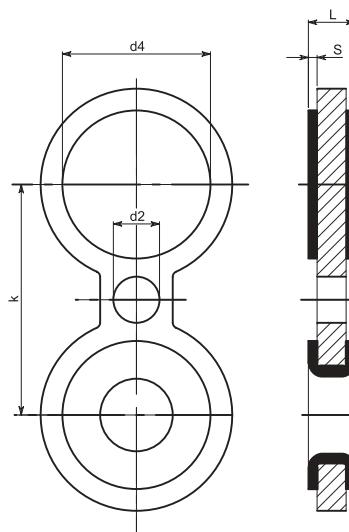
# PTFE Lined Spectacle Blind (ANSI)

0104

*Carbon Steel*

Dimensional Data per Class 150

| Size | L (mm) | S    | K     | d2   | d4  | Weight (ca Kg) |
|------|--------|------|-------|------|-----|----------------|
| 1/2" | 18     | 3    | 60.5  | 15.9 | 35  | 0.5            |
| 3/4" | 20     | 3    | 69.9  | 15.9 | 43  | 0.55           |
| 1"   | 20     | 3    | 79.4  | 15.9 | 51  | 0.7            |
| 1.5" | 24     | 3    | 98.4  | 15.9 | 73  | 1.2            |
| 2"   | 25     | 4.5  | 120.6 | 19   | 92  | 1.4            |
| 3"   | 30     | 6    | 152.4 | 19   | 127 | 3              |
| 4"   | 30     | 6.5  | 190.5 | 19   | 158 | 4              |
| 6"   | 32     | 5    | 241.3 | 22.2 | 216 | 7.5            |
| 8"   | 35     | 6.25 | 298.4 | 22.2 | 270 | 12             |
| 10"  | 35     | 6.75 | 361.9 | 25.4 | 324 | 17             |
| 12"  | 38     | 6.5  | 431.8 | 25.4 | 381 | 28             |
| 14"  | 45     | 6.5  | 476.2 | 28.6 | 412 | 44             |
| 16"  | 50     | 6.5  | 539.7 | 28.6 | 470 | 65             |
| 18"  | 52     | 6.5  | 577.8 | 31.8 | 534 | 77             |
| 20"  | 56     | 6.5  | 635   | 31.8 | 584 | 102            |
| 24"  | 57     | 4.5  | 749.3 | 35.1 | 692 | 156            |



Notes:

- 1.) Drawing shows typical Select Series construction

## Part Number System

|   |     |     |    |   |    |    |   |     |
|---|-----|-----|----|---|----|----|---|-----|
| 1 | BRL | 250 | 15 | W | XX | 00 | 0 | 0XX |
|---|-----|-----|----|---|----|----|---|-----|

| Type     | Fitting         | Diameter   | Pressure  | Liner                          | Resin Type                   | Flanges         | Series           | Options    |   |
|----------|-----------------|--|---|--------------------------------|------------------------------|-----------------|------------------|------------|---|
| Finished | Spectacle Blind | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | 00 - Spec. Blind | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Lined Blind Flange (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series | Select Series |  |   |   |   |
|--------------|--------------|---------------|--|---|---|---|
|              | Class 150    | Class 150     | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   |   |
|              |              |               |  |   |   |   |
| 1/2"         | ◆◆           | ∅             | ✓  | ✓ | ✓ |   |
| 3/4"         | ◆◆           | ∅             | ✓  | ✓ | ✓ |   |
| 1"           | ◆            | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 1.5"         | ◆            | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 2"           | ◆            | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 3"           | ◆            | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 4"           | ◆            | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 6"           | ◆            | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 8"           | ◆◆           | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 10"          | ◆◆           | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 12"          | ◆◆           | ○             | ◆◆   | ∅ | ✓ | ✓ |
| 14"          |              |               | ◆◆◆  | ∅ | ✓ | ✓ |
| 16"          |              |               | ◆◆◆  | ∅ | ✓ | ✓ |
| 18"          |              |               | ◆◆◆  | ∅ | ✓ | ✓ |
| 20"          |              |               | ◆◆◆  | ∅ | ✓ | ✓ |
| 24"          |              |               | ◆◆◆  | ∅ | ✓ | ✓ |

\* Class 300 subject to CE approval

† These options also available in Value Series

Value Series conforms to ASTM F1545. Some Select Series items use components not listed in ASTM F1545.

|   |   |
|---|---|
| ◆◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)       | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request     | ○ Non-Vacuum Rated                            |

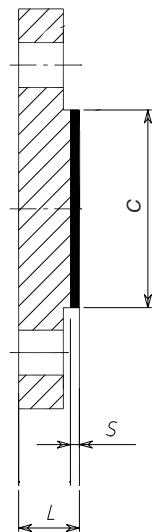
# PTFE Lined Blind Flange (ANSI)

0104

*Welded Steel*

Dimensional Data per Class 150

| Size | L (mm)       |               | C (mm) | S ±10%(mm)   |               | Weight<br>(ca. kg) |
|------|--------------|---------------|--------|--------------|---------------|--------------------|
|      | Value Series | Select Series |        | Value Series | Select Series |                    |
| 1/2" | 14           | 35            |        | 3            | 0.6           |                    |
| 3/4" |              | 43            |        | 3            | 0.8           |                    |
| 1"   | 19           | 17            | 51     | 5            | 3             | 1                  |
| 1.5" | 21           | 20            | 73     | 5            | 3             | 1.7                |
| 2"   | 24           | 22            | 92     | 5            | 3             | 2.6                |
| 3"   | 29           | 27            | 127    | 5            | 3.5           | 5.2                |
| 4"   | 29           | 28            | 157    | 5            | 4.5           | 7.2                |
| 6"   | 30           | 30            | 216    | 5            | 5             | 12                 |
| 8"   | 35           | 33            | 270    | 5            | 5             | 20                 |
| 10"  | 36           | 35            | 324    | 5            | 5             | 29.5               |
| 12"  | 38           | 37            | 381    | 5            | 5             | 44                 |
| 14"  | 40           | 412           |        | 5            | 58.5          |                    |
| 16"  |              | 470           |        | 6            | 77            |                    |
| 18"  |              | 534           |        | 6            | 95            |                    |
| 20"  |              | 585           |        | 6            | 124           |                    |
| 24"  |              | 692           |        | 6            | 187           |                    |



Notes:

- 1.) Drawing shows typical Value Series construction

## Part Number System

|          |              |   |  |                             |                           |                 |                     |                      |  |
|----------|--------------|---|--|-----------------------------|---------------------------|-----------------|---------------------|----------------------|--|
| 1        | BFL          | 250   | 15   | W                           | XX                        | 00              | 0                   | 0XX                  |  |
| Type     | Fitting      | Diameter  | Pressure   | Liner                       | Resin Type                | Flanges         | Series              | Options              |  |
| Finished | Blind Flange | 015 - 1/2" 020 - 3/4" 025 - 1" 040 - 1 1/2" 050 - 2" 080 - 3" 100 - 4" 150 - 6" | 200 - 8" 250 - 10" 300 - 12" 350 - 14" 400 - 16" 450 - 18" 500 - 20" 600 - 24" | 15 - ANSI 150 30 - ANSI 300 | W - White E - Anti-Static | Factory Defined | 00 - Flange Fitting | 1 - Value 0 - Select | 0XX - Standard 052 - Earthing Stud 054 - Vent Boss 070 - Stainless Steel |

# PTFE Lined Bent Pipe Spool (ANSI)

ASTM F1545  
CE, PED Cat. III (>1")  
TEFLON® by DuPont



| Nominal Size | Value Series   | Select Series |  |                         |                  |                  |               |                |
|--------------|--|---------------|--|-------------------------|------------------|------------------|---------------|----------------|
|              |  | F x F         | Options below not available on stock items. Option selection may affect manufacturing lead time. Consult factory for price and delivery. |                         |                  |                  |               |                |
|              |  | Class 150     | Class 300*   | Stainless Steel Housing | Conductive Liner | Heavy Duty Liner | Special Paint | Earthing Studs |
|              | Bent Pipe Spools<br>Not Available in<br>Value Series |               |  |                         |                  |                  |               |                |
| 1"           |  | ◆◆ ●          | ✓ ✓ ✓  |                         |                  |                  |               |                |
| 1 1/2"       |  | ◆◆ ●          | ✓ ✓ ✓  |                         |                  | ✓                | ✓             | ✓              |
| 2"           |  | ◆◆ ●          | ✓ ✓ ✓  |                         |                  |                  |               |                |
| 3"           |  | ◆◆ ●          | ✓ ✓ ✓  |                         |                  |                  |               |                |

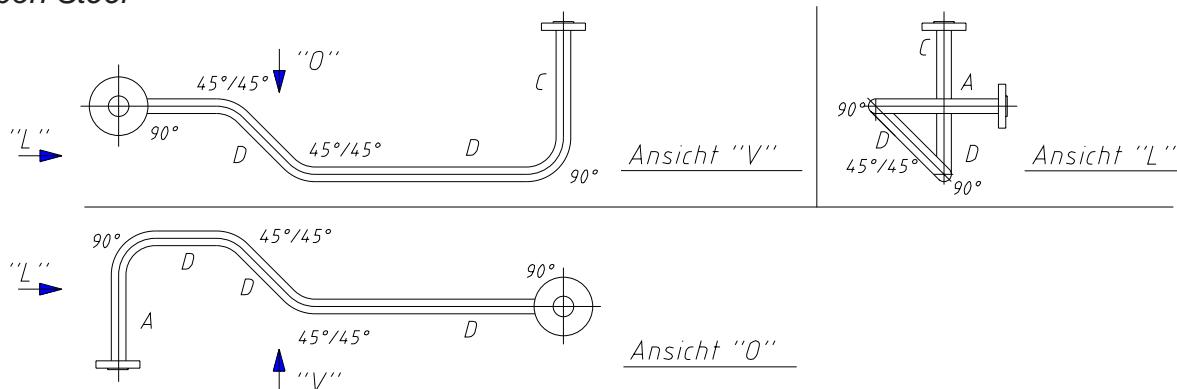
\* Class 300 subject to CE approval  
Some Select Series items use components not listed in ASTM F1545.

- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Lined Bent Pipe Spool (ANSI)

0104

## Carbon Steel



- The straight length of the pipe spool before bending can be up to 6 meters maximum.
- The straight lengths of the pipe spools before bending have to be calculated and are shorter than the sum of the center-center and center-face dimensions.
- The bend angles are available from 0° to 180°. Tolerances are  $\pm 0.5^\circ$  in all three dimensions. Also important is the angle of twist, or roll.
- Due to the high stress imparted to the steel and PTFE during bending, it may not be possible to meet custom requirements that are different than the values in the table.
- After bending, the ovality of the pipe will be within 6.5% of original values, and the pipe wall thickness will be within 15% of original thickness.
- Pipe Material will be RSt 37.0 WBN acc. to AD-W4

## Dimensional Data

| Size | Steel Pipe Dimensions |                          | PTFE Liner Thickness (mm) | Bend Radius (mm) | Minimum Leg Dimensions |        |        |
|------|-----------------------|--------------------------|---------------------------|------------------|------------------------|--------|--------|
|      | Outside Diameter (mm) | Pipe Wall Thickness (mm) |                           |                  | A (mm)                 | C (mm) | D (mm) |
| 1"   | 33.7                  | 3.6                      | 3                         | 72.5             | 205                    | 415    | 320    |
| 1.5" | 48.3                  | 3.2                      | 3                         | 107.5            | 350                    | 460    | 540    |
| 2"   | 60.3                  | 3.6                      | 3                         | 135              | 375                    | 540    | 580    |
| 3"   | 88.9                  | 4                        | 3.5                       | 214              | 465                    | 600    | 670    |

## Part Number System

|          |                 |  |                                |                              |                 |  |            |   |
|----------|-----------------|--|--------------------------------|------------------------------|-----------------|--|------------|---|
| 1        | ROG             | 250  | 15                             | W                            | XX              | LL   | 0          | 0XX   |
| Type     | Fitting         | Diameter   | Pressure                       | Liner                        | Resin Type      | Flanges  | Series     | Options   |
| Finished | Bent Lined Pipe | 025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | LL - Loose/Loose<br>FL - Fixed/Loose<br>FF - Fixed/Fixed | 0 - Select | 0XX - Standard<br>052 - Earthing Stud<br>054 - Vent Boss<br>070 - Stainless Steel |

# PTFE Nozzle Liner (ANSI)

*CE, PED Cat. III (>1")  
TEFLON® by DuPont*



| Nominal Size | Value Series                             | Select Series | Option selection may affect manufacturing lead time. Consult factory for price and delivery. |
|--------------|--|---------------|--|
|              | Value Series<br>Spacers<br>Not Available |               |  |
| 1 1/2"       | ◆◆                                       |               |  |
| 2"           | ◆◆                                       |               |  |
| 3"           | ◆◆                                       |               |  |
| 4"           | ◆◆                                       |               |  |
| 6"           | ◆◆                                       |               |  |
| 8"           | ◆◆                                       |               |  |
| 10"          | ◆◆◆                                      |               | ✓  |
| 12"          | ◆◆◆                                      |               |  |
| 14"          | ◆◆◆                                      |               |  |
| 16"          | ◆◆◆                                      |               |  |
| 18"          | ◆◆◆                                      |               |  |
| 20"          | ◆◆◆                                      |               |  |
| 24"          | ◆◆◆                                      |               |  |

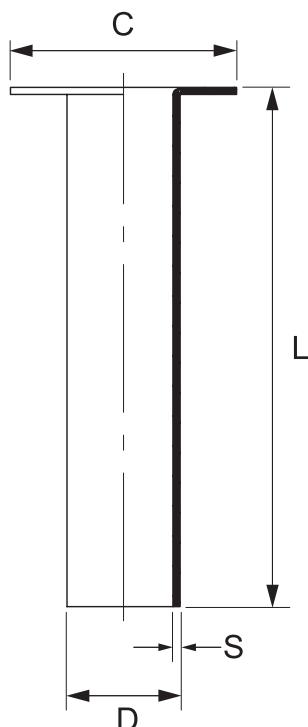
- ◆ Best Price & Lead Time (1 - 2 Weeks)
- ◆◆ Longer Lead Time (4 - 6 Weeks)
- ◆◆◆ Price and Delivery Upon Request

# PTFE Nozzle Liner (ANSI)

0104

## Dimensional Data

| Size | Max. L (mm) | S (mm) | C (mm) | D (mm) |
|------|-------------|--------|--------|--------|
| 1.5" | 1500        | 2.75   | 73     | 29     |
| 2"   | 1500        | 3.25   | 92     | 40.5   |
| 3"   | 1500        | 3      | 127    | 66     |
| 4"   | 1500        | 4      | 158    | 89     |
| 6"   | 1500        | 4.5    | 210    | 139    |
| 8"   | 1500        | 6      | 265    | 180    |
| 10"  | 1500        | 6      | 320    | 231    |
| 12"  | 1500        | 6.5    | 370    | 278    |
| 14"  | 1500        | 5.5    | 412    | 294    |
| 16"  | 1500        | 6.5    | 470    | 357    |
| 18"  | 1500        | 6.5    | 520    | 414    |
| 20"  | 1500        | 6.5    | 585    | 444    |
| 24"  | 1000        | 4.5    | 685    | 560    |



## Part Number System

| 1        | NOZ          | 250   | 15   | W         | XX                           | 00              | 0                 | 0XX        |                |
|----------|--------------|---|--|-----------|------------------------------|-----------------|-------------------|------------|----------------|
| Type     | Fitting      | Diameter  | Pressure   | Liner     | Resin Type                   | Flanges         | Series            | Options    |                |
| Finished | Nozzle Liner | 015 - 1/2" 020 - 3/4" 025 - 1" 040 - 1 1/2" 050 - 2" 080 - 3" 100 - 4" 150 - 6" | 200 - 8" 250 - 10" 300 - 12" 350 - 14" 400 - 16" 450 - 18" 500 - 20" 600 - 24" | 15 - ANSI | W - White<br>E - Anti-Static | Factory Defined | 00 - Nozzle Liner | 0 - Select | 0XX - Standard |

# PTFE Lined Dip Pipe

*CE, PED Cat. III (>025)  
TEFLON® by DuPont*



| DN    | Value Series | Select Series | Options  |   |   |   |   |   |
|-------|--------------|---------------|--|---|---|---|---|---|
|       | Class 150    | Class 150     | Option selection may affect manufacturing lead time. Consult factory for price and delivery. |   |   |   |   |   |
|       |              |               |  |   |   |   |   |   |
| 1"    | ◆◆ ◎         |               | ✓  | ✓ | ✓ |   |   |   |
| 1.25" |              | ◆◆◆ ◎         | ✓  | ✓ | ✓ |   |   |   |
| 1.5"  |              | ◆◆◆ ◎         | ✓  | ✓ | ✓ |   |   |   |
| 2"    | ◆◆ ◎         |               | ✓  | ✓ | ✓ |   |   |   |
| 2,5"  |              | ◆◆◆ ◎         | ✓  | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3"    | ◆◆ ◎         |               | ✓  | ✓ | ✓ |   |   |   |
| 4"    | ◆◆ ◎         |               | ✓  | ✓ | ✓ |   |   |   |
| 6"    |              | ◆◆◆ ◎         | ✓  | ✓ | ✓ |   |   |   |
| 8"    |              | ◆◆◆ ◎         | ✓  | ✓ | ✓ |   |   |   |

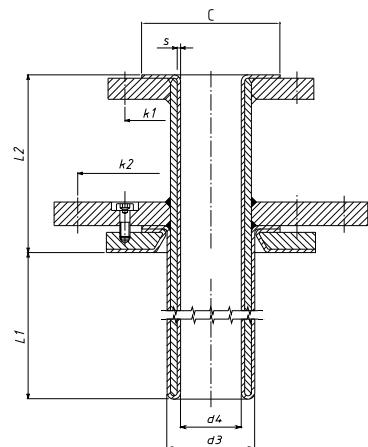
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Lined Dip Pipe

*Fabricated Steel*

Dimensional Data per PN 10

| DN 1  | Outside Dia.<br>x Wall<br>(mm) | Type | L1<br>$\pm 25$ mm | L2<br>$\pm 5$ mm | d3<br>(mm) | d4<br>(mm) | C<br>(mm) | S $\pm 10\%$<br>(mm) | Weight<br>of Pipe<br>(kg/m) |
|-------|--------------------------------|------|-------------------|------------------|------------|------------|-----------|----------------------|-----------------------------|
| 1"    | 33,7 x 2,6                     | I    | 3000              | 150              | 39         | 23         | 68        | 2,7                  | 2,6                         |
| 1,25" | 42,4 x 2,6                     | I    | 2000              | 150              | 49         | 30,5       | 78        | 3,3                  | 3,3                         |
| 1,5"  | 48,3 x 3,2                     | I    | 2600              | 150              | 55         | 35,5       | 88        | 3,2                  | 4,4                         |
|       | 48,3 x 5,6                     | II   | 2800              | 150              | 54         | 32         |           | 2,7                  | 7,3                         |
| 2"    | 60,3 x 4,5                     | I    | 2500              | 150              | 67         | 45         | 102       | 3,3                  | 7,9                         |
|       | 60,3 x 8,0                     | II   | 2700              | 150              | 67         | 38         |           | 3,3                  | 12,2                        |
| 2,5"  | 76,1 x 4,0                     | I    | 1800              | 150              | 82,5       | 62         | 122       | 3,1                  | 9,2                         |
| 3"    | 88,9 x 4,5                     | I    | 2100              | 150              | 96         | 73         | 138       | 3,4                  | 12,2                        |
|       | 88,9 x 10,0                    | II   | 2300              | 150              | 96         | 62         |           | 3,4                  | 22,3                        |
|       | 88,9 x 14,2                    | III  | 2400              | 150              | 96         | 54         |           | 3,4                  | 29                          |
| 4"    | 114,3 x 5,0                    | I    | 2100              | 150              | 124,5      | 94         | 158       | 5                    | 17,5                        |
|       | 114,3 x 10,0                   | II   | 2200              | 150              | 124,5      | 84         |           | 5                    | 29,7                        |
|       | 114,3 x 16,0                   | III  | 2400              | 150              | 124,5      | 72         |           | 5                    | 42,6                        |
| 6"    | 168,3 x 6,3                    | I    | 1900              | 150              | 177,5      | 147        | 212       | 4,5                  | 30,8                        |
|       | 168,3 x 8,0                    | II   | 1900              | 150              | 177,5      | 143        |           | 4,5                  | 36,9                        |
| 8"    | 219,1 x 6,3                    | I    | 2100              | 150              | 230        | 196        | 268       | 5,3                  | 41,2                        |



Part Number System

| 1        | TAN      | 100             | 15                               | W                            | XX              | 00      | 00XX  |
|----------|----------|-----------------|----------------------------------|------------------------------|-----------------|---------|---|
| Typ      | Fitting  | Diameter        | Pressure                         | Liner                        | PTFE Type       | Flanges | Options   |
| Finished | Dip Pipe | Factory Defined | 15 - Class 150<br>30 - Class 300 | W - White<br>E - Anti-Static | Factory Defined | 00      | 00XX - Standard<br>0052 - Earthing Stud<br>0070 - Stainless Steel |

# PTFE Lined Sparger

*CE, PED Cat. III (>025)  
TEFLON® by DuPont*



| DN    | Value Series | Select Series | Options   |                         |                               |                  |  |
|-------|--------------|---------------|---|-------------------------|-------------------------------|------------------|--|
|       | Class 150    | Class 150     | Option selection may affect manufacturing lead time. Consult factory for price and delivery |                         |                               |                  |  |
|       |              |               | Class 300 Flange  | Stainless Steel Housing | Use in Vessels with Agitators | Conductive Liner |  |
| 1"    | ◆◆ ◎         |               | ✓   | ✓                       | ✓                             |                  |  |
| 1.25" |              | ◆◆◆ ◎         | ✓   | ✓                       | ✓                             |                  |  |
| 1.5"  |              | ◆◆◆ ◎         | ✓   | ✓                       | ✓                             |                  |  |
| 2"    | ◆◆ ◎         |               | ✓   | ✓                       | ✓                             |                  |  |
| 2,5"  |              | ◆◆◆ ◎         | ✓   | ✓                       | ✓                             | ✓                |  |
| 3"    | ◆◆ ◎         |               | ✓   | ✓                       | ✓                             |                  |  |
| 4"    | ◆◆ ◎         |               | ✓   | ✓                       | ✓                             |                  |  |
| 6"    |              | ◆◆◆ ◎         | ✓   | ✓                       | ✓                             |                  |  |
| 8"    |              | ◆◆◆ ◎         | ✓   | ✓                       | ✓                             |                  |  |

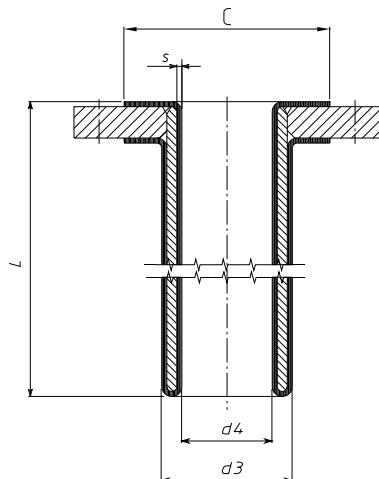
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ◎ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE Lined Sparger

*Fabricated Steel*

Dimensional Data per Class 150

| DN    | Outside Dia.<br>x Wall<br>(mm) | Type | L<br>$\pm 25$ mm | d3<br>(mm) | d4<br>(mm) | C<br>(mm) | S $\pm 10\%$<br>(mm) | Weight<br>of Pipe<br>(kg/m) | Weight<br>of Flange<br>(kg) |
|-------|--------------------------------|------|------------------|------------|------------|-----------|----------------------|-----------------------------|-----------------------------|
| 1"    | 33,7 x 2,6                     | I    | 3000             | 39         | 23         | 68        | 2,7                  | 2,9                         | 1,2                         |
| 1,25" | 42,4 x 2,6                     | I    | 2000             | 49         | 30,5       | 78        | 3,3                  | 3,6                         | 1,7                         |
| 1,5"  | 48,3 x 3,2                     | I    | 2700             | 55         | 35,5       | 88        | 3,2                  | 4,4                         | 1,9                         |
|       | 48,3 x 5,6                     | II   | 2900             | 54         | 32         |           | 2,7                  | 7,3                         | 1,9                         |
| 2"    | 60,3 x 4,5                     | I    | 2600             | 67         | 45         | 102       | 3,3                  | 7,9                         | 2,5                         |
|       | 60,3 x 8,0                     | II   | 2800             | 67         | 38         |           | 3,3                  | 12,2                        | 2,5                         |
| 2,5"  | 76,1 x 4,0                     | I    | 1900             | 82,5       | 62         | 122       | 3,1                  | 9,2                         | 3,0                         |
| 3"    | 88,9 x 4,5                     | I    | 2200             | 96         | 73         | 138       | 3,4                  | 12,2                        | 3,8                         |
|       | 88,9 x 10,0                    | II   | 2400             | 96         | 62         |           | 3,4                  | 22,3                        | 3,8                         |
|       | 88,9 x 14,2                    | III  | 2500             | 96         | 54         |           | 3,4                  | 29                          | 3,8                         |
| 4"    | 114,3 x 5,0                    | I    | 2200             | 124,5      | 94         | 158       | 5                    | 17,5                        | 4,1                         |
|       | 114,3 x 10,0                   | II   | 2300             | 124,5      | 84         |           | 5                    | 29,7                        | 4,1                         |
|       | 114,3 x 16,0                   | III  | 2400             | 124,5      | 72         |           | 5                    | 42,6                        | 4,1                         |
| 6"    | 168,3 x 6,3                    | I    | 2000             | 177,5      | 147        | 212       | 4,5                  | 31,1                        | 6,6                         |
|       | 168,3 x 8,0                    | II   | 2000             | 177,5      | 143        |           | 4,5                  | 37,2                        | 6,6                         |
| 8"    | 219,1 x 6,3                    | I    | 2100             | 230        | 196        | 268       | 5,3                  | 41,2                        | 9,4                         |



## Part Number System

| 1        | ELR                      | 100   | 15                               | W                            | XX              | FN1  | 0XX   |
|----------|--------------------------|---|----------------------------------|------------------------------|-----------------|--|---|
| Typ      | Fitting                  | Diameter  | Pressure                         | Liner                        | PTFE Type       | Flanges                                      | Options   |
| Finished | PTFE<br>lined<br>Sparger | 025 - 1"<br>032 - 1,25"<br>040 - 1,5"<br>050 - 2"<br>065 - 2,5"<br>080 - 3"<br>100 - 4"<br>150 - 6"<br>200 - 8" | 15 - Class 150<br>30 - Class 300 | W - White<br>E - Anti-Static | Factory Defined | FN1 = Type 1<br>FN2 = Type 2<br>FN3 = Type 3 | 00XX - Standard<br>0052 - Earthing Stud<br>0070 - Stainless Steel |

# PTFE Diaphragm

*TEFLON® by DuPont*



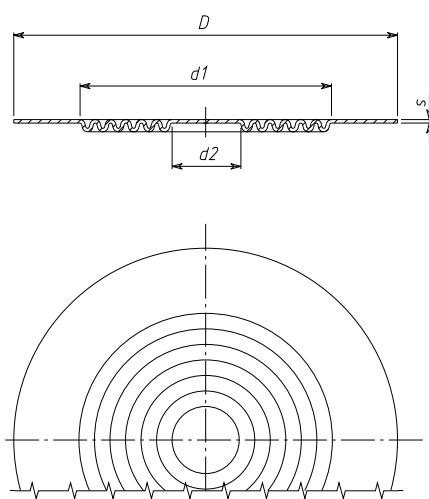
| max. Outside Diameter | Number of Convolute | Value Series                  | Select Series | Opt. |             |
|-----------------------|---------------------|-------------------------------|---------------|------|-------------|
|                       |                     | not available in Value Series |               |      | White Liner |
| 135                   | 3                   |                               | ◆◆            |      | ✓           |
| 145                   | 6                   |                               | ◆◆            |      | ✓           |
| 165                   | 8                   |                               | ◆◆            |      | ✓           |
| 190                   | 8                   |                               | ◆◆            |      | ✓           |
| 210                   | 6                   |                               | ◆◆            |      | ✓           |
|                       | 6                   |                               | ◆◆            |      | ✓           |
| 240                   | 13                  |                               | ◆◆            |      | ✓           |
|                       | 8                   |                               | ◆◆            |      | ✓           |
|                       | 11                  |                               | ◆◆            |      | ✓           |
| 245                   | 8                   |                               | ◆◆            |      | ✓           |
|                       | 8                   |                               | ◆◆            |      | ✓           |
|                       | 8                   |                               | ◆◆            |      | ✓           |
| 260                   | 11                  |                               | ◆◆            |      | ✓           |
| 270                   | 8                   |                               | ◆◆            |      | ✓           |
| 275                   | 9                   |                               | ◆◆            |      | ✓           |
| 295                   | 9                   |                               | ◆◆            |      | ✓           |
| 300                   | 9                   |                               | ◆◆            |      | ✓           |
| 330                   | 13                  |                               | ◆◆            |      | ✓           |
| 395                   | 13                  |                               | ◆◆            |      | ✓           |
| 440                   | 17                  |                               | ◆◆            |      | ✓           |
| 450                   | 13                  |                               | ◆◆            |      | ✓           |
| 490                   | 16                  |                               | ◆◆            |      | ✓           |

- ◆ Best Price & Lead Time (1 - 2 Weeks)
- ◆◆ Longer Lead Time (4 - 6 Weeks)
- ◆◆◆ Price and Delivery Upon Request

# PTFE Diaphragm

## Dimensional data

| max. Outside Dia.<br>+0% / -3%<br>(mm) | Number of<br>Convolute | d1<br>± 5%<br>(mm) | d2<br>± 5%<br>(mm) | S<br>±10%<br>(mm) |
|--|------------------------|--------------------|--------------------|-------------------|
| 135                                    | 3                      | 52                 | 25                 | 1,5               |
| 145                                    | 6                      | 65                 | 25                 | 1,5               |
| 165                                    | 8                      | 99                 | 40                 | 1,5               |
| 190                                    | 8                      | 96                 | 38                 | 1,5               |
| 210                                    | 6                      | 62                 | 17                 | 1,8               |
| 210                                    | 6                      | 75                 | 17                 | 1,8               |
| 240                                    | 13                     | 110                | 14                 | 2,3               |
| 240                                    | 8                      | 145                | 40                 | 2,3               |
| 240                                    | 11                     | 200                | 66                 | 2,3               |
| 245                                    | 8                      | 96                 | 40                 | 2,3               |
| 245                                    | 8                      | 140                | 55                 | 2,3               |
| 245                                    | 8                      | 143                | 45                 | 2,3               |
| 260                                    | 11                     | 200                | 73                 | 2,5               |
| 270                                    | 8                      | 132                | 40                 | 2,5               |
| 275                                    | 9                      | 160                | 54                 | 2,5               |
| 295                                    | 9                      | 160                | 55                 | 2,5               |
| 300                                    | 9                      | 165                | 55                 | 2,5               |
| 330                                    | 13                     | 207                | 55                 | 2,5               |
| 395                                    | 13                     | 208                | 54                 | 2,7               |
| 440                                    | 17                     | 258                | 54                 | 3,3               |
| 450                                    | 13                     | 280                | 52                 | 3,3               |
| 490                                    | 16                     | 330                | 50                 | 3,3               |



## Part Number System

|   |     |     |    |   |          |
|---|-----|-----|----|---|----------|
| 1 | MEM | 245 | 08 | W | 00000000 |
|---|-----|-----|----|---|----------|

| Typ                           | Fitting | max. Outside Diameter | Number of Conv. | Liner                  | Options           |
|-------------------------------|---------|-----------------------|-----------------|------------------------|-------------------|
| Finished<br>PTFE<br>Diaphragm |         | 135                   | 03              | W - White<br>S - Black | 00000000-Standard |
|                               |         | 145                   | 06              |                        |                   |
|                               |         | 165                   | 08              |                        |                   |
|                               |         | 190                   | 09              |                        |                   |
|                               |         | 210                   | 11              |                        |                   |
|                               |         | 240                   | 13              |                        |                   |
|                               |         | 245                   | 16              |                        |                   |
|                               |         | 260                   | 17              |                        |                   |
|                               |         | 270                   |                 |                        |                   |

## 2 Convoluted PTFE Expansion Joints with Reinforcing Rings



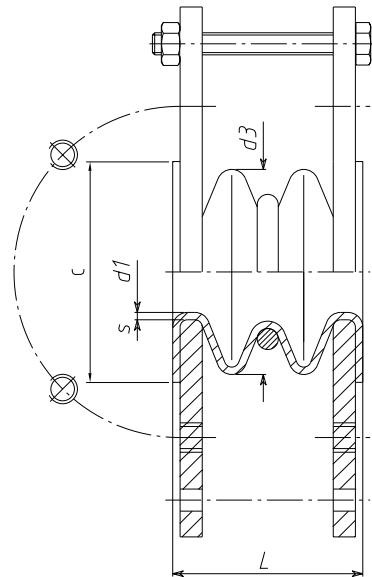
| DN    | Value Series<br><br>not available in Value Series | Select Series<br><br>Class 150 | Options  |   |   |   |
|-------|---|--------------------------------|--|---|---|---|
|       |   |                                | <i>Option selection may affect manufacturing lead time. Consult factory for price and delivery</i> |   |   |   |
|       |   |                                |  |   |   |   |
| 0.5"  |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 0.75" |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 1"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 1.5"  |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 2"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 2.5"  |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 3"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 4"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 5"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 6"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 8"    |   | ◆◆                             | ∅  | ✓ | ✓ | ✓ |
| 10"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |
| 12"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |
| 14"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |
| 16"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |
| 18"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |
| 20"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |
| 24"   |   | ◆◆◆                            | ∅  | ✓ | ✓ | ✓ |

- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

## 2 Convoluted PTFE Expansion Joints with Reinforcing Rings

Dimensional Data

| DN    | L<br>± 2%<br>(mm) | Thread      | C<br>(mm) | S<br>±10 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-------|-------------------|-------------|-----------|--------------------|----------------------|----------------------|--------------------|
| 0.5"  | 35                | 4 x 1/2"    | 35        | 3                  | 24                   | 43                   | 1,6                |
| 0.75" | 35                | 4 x 1/2"    | 43        | 3                  | 24                   | 43                   | 1,6                |
| 1"    | 35                | 4 x 1/2"    | 51        | 3                  | 24                   | 43                   | 1,6                |
| 1.5"  | 35                | 4 x 1/2"    | 73        | 3                  | 36                   | 57                   | 2,5                |
| 2"    | 40                | 4 x 5/8"    | 92        | 3                  | 50                   | 75                   | 3,6                |
| 2.5"  | 57                | 4 x 5/8"    | 105       | 3                  | 60                   | 91                   | 4,4                |
| 3"    | 57                | 4 x 5/8"    | 127       | 3,5                | 76                   | 104                  | 5,2                |
| 4"    | 67                | 8 x 5/8"    | 158       | 4                  | 100                  | 134                  | 6,9                |
| 5"    | 83                | 8 x 3/4"    | 186       | 4,25               | 122                  | 163                  | 11,2               |
| 6"    | 75                | 8 x 3/4"    | 216       | 4,5                | 150                  | 188                  | 12,3               |
| 8"    | 102               | 8 x 3/4"    | 270       | 5,25               | 204                  | 250                  | 20                 |
| 10"   | 140               | 12 x 7/8"   | 324       | 5,25               | 255                  | 325                  | 26                 |
| 12"   | 150               | 12 x 7/8"   | 381       | 5,5                | 280                  | 345                  | 33                 |
| 14"   | 160               | 12 x 1"     | 412       | 6                  | 350                  | 438                  | 57                 |
| 16"   | 178               | 16 x 1"     | 470       | 6,5                | 390                  | 462                  | 72                 |
| 18"   | 185               | 16 x 1 1/8" | 534       | 6,5                | 425                  | 515                  | 79                 |
| 20"   | 230               | 20 x 1 1/8" | 585       | 6,5                | 470                  | 555                  | 83                 |
| 24"   | 160               | 20 x 1 1/4" | 692       | 5                  | 575                  | 665                  | 108                |



Part Number System

|          |                                   |  |   |               |                              |                |         |   |
|----------|-----------------------------------|--|---|---------------|------------------------------|----------------|---------|---|
| 1        | K2W                               | 250  | 15  | W             | P1                           | SS             | 00XX    |   |
| Type     | Fitting                           | Diameter   | Pressure  | Liner         | Resin Type                   | Flanges        | Options |   |
| Finished | Expansion Joint with 2 Convolutes | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150 | W - White<br>E - Anti-Static | Paste Standard | SS      | 0017 - Standard 1.0038<br>0018 - Flanges 1.4541 |

## 3 Convoluted PTFE Expansion Joints with Reinforcing Rings



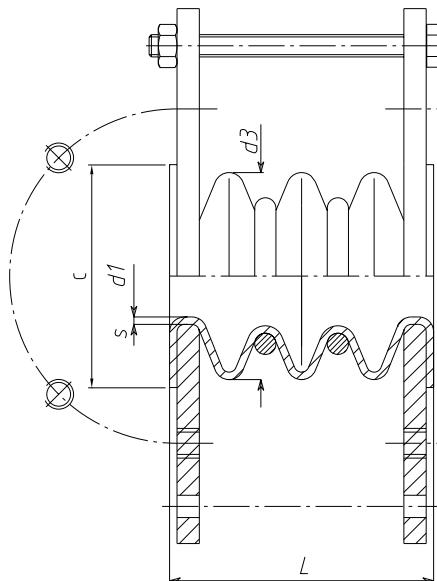
| DN    | Value Series                  | Select Series | Options   |   |                   |                  |   |
|-------|-------------------------------|---------------|-----------|---|-------------------|------------------|---|
|       |                               |               | Class 150 | Option selection may affect manufacturing lead time. Consult factory for price and delivery |                   |                  |   |
|       | not available in Value Series |               |           | Flanges of 1.0038   | Flanges of 1.4541 | Conductive Liner |   |
| 0.5"  |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 0.75" |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 1"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 1.5"  |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 2"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 2.5"  |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 3"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 4"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 5"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 6"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 8"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 10"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 12"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 14"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 16"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 18"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 20"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |
| 24"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                | ✓ |

- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

### 3 Convoluted PTFE Expansion Joints with Reinforcing Rings

Dimensional Data

| DN    | L<br>± 2%<br>(mm) | Thread      | C<br>(mm) | S<br>±10 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-------|-------------------|-------------|-----------|--------------------|----------------------|----------------------|--------------------|
| 0.5"  | 45                | 4 x 1/2"    | 35        | 3                  | 24                   | 43                   | 1,7                |
| 0.75" | 45                | 4 x 1/2"    | 43        | 3                  | 24                   | 43                   | 1,7                |
| 1"    | 46                | 4 x 1/2"    | 51        | 3                  | 24                   | 43                   | 1,7                |
| 1.5"  | 50                | 4 x 1/2"    | 73        | 3                  | 36                   | 57                   | 2,6                |
| 2"    | 56                | 4 x 5/8"    | 92        | 3                  | 50                   | 75                   | 3,8                |
| 2.5"  | 77                | 4 x 5/8"    | 105       | 3                  | 60                   | 91                   | 4,6                |
| 3"    | 77                | 4 x 5/8"    | 127       | 3,5                | 76                   | 104                  | 5,3                |
| 4"    | 91                | 8 x 5/8"    | 158       | 4                  | 100                  | 134                  | 7                  |
| 5"    | 111               | 8 x 3/4"    | 186       | 4,25               | 122                  | 163                  | 11,4               |
| 6"    | 101               | 8 x 3/4"    | 216       | 4,5                | 150                  | 188                  | 12,7               |
| 8"    | 137               | 8 x 3/4"    | 270       | 5,25               | 204                  | 250                  | 21                 |
| 10"   | 200               | 12 x 7/8"   | 324       | 5,25               | 255                  | 325                  | 27                 |
| 12"   | 196               | 12 x 7/8"   | 381       | 5,5                | 280                  | 345                  | 35                 |
| 14"   | 215               | 12 x 1"     | 412       | 6                  | 350                  | 438                  | 60                 |
| 16"   | 233               | 16 x 1"     | 470       | 6,5                | 390                  | 462                  | 75                 |
| 18"   | 280               | 16 x 1 1/8" | 534       | 6,5                | 425                  | 515                  | 91                 |
| 20"   | 327               | 20 x 1 1/8" | 585       | 6,5                | 470                  | 555                  | 110                |
| 24"   | 300               | 20 x 1 1/4" | 692       | 5                  | 575                  | 665                  | 140                |



Part Number System

|          |                                   |  |   |               |                              |                |         |   |
|----------|-----------------------------------|--|---|---------------|------------------------------|----------------|---------|---|
| 1        | K3W                               | 250  | 15  | W             | P1                           | SS             | 00XX    |   |
| Type     | Fitting                           | Diameter   | Pressure  | Liner         | Resin Type                   | Flanges        | Options |   |
| Finished | Expansion Joint with 3 Convolutes | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16"<br>450 - 18"<br>500 - 20"<br>600 - 24" | 15 - ANSI 150 | W - White<br>E - Anti-Static | Paste Standard | SS      | 0017 - Standard 1.0038<br>0018 - Flanges 1.4541 |

# 5 Convoluted SHD PTFE Expansion Joints with Reinforcing Rings



| DN    | Value Series                  | Select Series | Options   |   |                   |                  |
|-------|-------------------------------|---------------|-----------|---|-------------------|------------------|
|       |                               |               | Class 150 | Option selection may affect manufacturing lead time. Consult factory for price and delivery |                   |                  |
|       | not available in Value Series |               |           | Flanges of 1.0038   | Flanges of 1.4541 | Conductive Liner |
| 0.5"  |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 0.75" |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 1"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 1.5"  |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 2"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 2.5"  |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 3"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 4"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 5"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 6"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 8"    |                               | ◆◆ ○          |           | ✓   | ✓                 | ✓ ✓              |
| 10"   |                               | ◆◆◆ ○         |           | ✓   | ✓                 | ✓ ✓              |
| 12"   |                               | ◆◆◆ ○         |           | ✓   | ✓                 | ✓ ✓              |
| 14"   |                               | ◆◆◆ ○         |           | ✓   | ✓                 | ✓ ✓              |
| 16"   |                               | ◆◆◆ ○         |           | ✓   | ✓                 | ✓ ✓              |

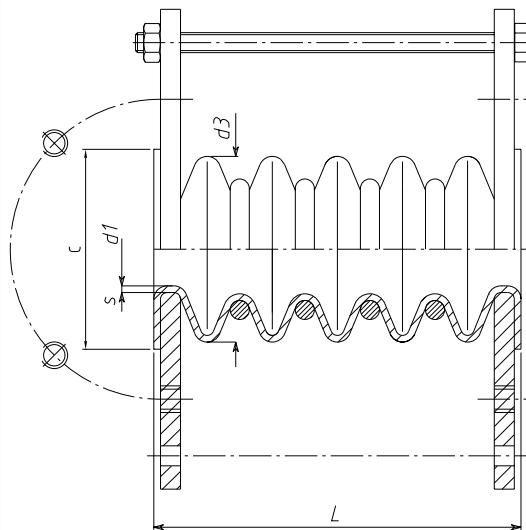
Standard

- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ⊖ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# 5 Convoluted PTFE SHD Expansion Joints with Reinforcing Rings

## Dimensional Data

| DN    | L<br>± 3%<br>(mm) | Thread<br>DIN 2501 | C<br>(mm) | S<br>min.<br>(mm) | S<br>max.<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-------|-------------------|--------------------|-----------|-------------------|-------------------|----------------------|----------------------|--------------------|
| 0.5"  | 87                | 4 x 1/2"           | 35        | 2                 | 5                 | 23                   | 41                   | 1,6                |
| 0.75" | 87                | 4 x 1/2"           | 43        | 2                 | 5                 | 23                   | 42                   | 1,7                |
| 1"    | 87                | 4 x 1/2"           | 51        | 2,25              | 5                 | 24                   | 43                   | 1,8                |
| 1.5"  | 94                | 4 x 1/2"           | 73        | 2,25              | 5                 | 36                   | 57                   | 2,7                |
| 2"    | 112               | 4 x 5/8"           | 92        | 2,25              | 5                 | 50                   | 75                   | 4                  |
| 2.5"  | 124               | 4 x 5/8"           | 105       | 2,25              | 5                 | 60                   | 91                   | 4,8                |
| 3"    | 126               | 4 x 5/8"           | 127       | 2,75              | 6                 | 76                   | 104                  | 5,8                |
| 4"    | 157               | 8 x 5/8"           | 158       | 2,75              | 6                 | 100                  | 134                  | 7,7                |
| 5"    | 187               | 8 x 3/4"           | 186       | 2,75              | 6                 | 122                  | 163                  | 12                 |
| 6"    | 176               | 8 x 3/4"           | 216       | 3                 | 6,75              | 150                  | 188                  | 13,5               |
| 8"    | 223               | 8 x 3/4"           | 270       | 3,5               | 6,75              | 204                  | 250                  | 22,5               |
| 10"   | 310               | 12 x 7/8"          | 324       | 3,25              | 7                 | 255                  | 325                  | 28,4               |
| 12"   | 318               | 12 x 7/8"          | 381       | 4                 | 7,5               | 280                  | 345                  | 37                 |
| 14"   | 314               | 12 x 1"            | 412       | 4,5               | 9                 | 335                  | 435                  | 61                 |
| 16"   | 375               | 16 x 1"            | 470       | 5                 | 10                | 390                  | 462                  | 78                 |



## Part Number System

|          |                                   |  |  |  |            |         |  |
|----------|-----------------------------------|--|--|--|------------|---------|--|
| 1        | K5W                               | 250  | 15   | W  | P3         | SS      | 00XX   |
| Type     | Fitting                           | Diameter   | Pressure   | Liner  | Resin Type | Flanges | Options  |
| Finished | Expansion Joint with 5 Convolutes | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16" | 15 - ANSI 15<br>W - White<br>E - Anti-Static | Paste SHD  | SS      | 0017 - Standard 1.0038<br>0018 - Flansche 1.4541 |

## 2 Convoluted PTFE SHD Expansion Joints with Reinforcing Rings



| DN    | Value Series<br><br>not available in Value Series | Select Series<br><br>Class 150 | Options           |                   |                  |                    |
|-------|---|--------------------------------|-------------------|-------------------|------------------|--------------------|
|       |   |                                | Flanges of 1.0038 | Flanges of 1.4541 | Conductive Liner | Limit Bolt Inox A2 |
| 0.5"  |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 0.75" |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 1"    |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 1.5"  |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 2"    |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 2.5"  |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 3"    |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 4"    |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 5"    |   | ◆◆ ●                           | ✓                 | ✓                 | ✓                | ✓                  |
| 6"    |   | ◆◆ ○                           | ✓                 | ✓                 | ✓                | ✓                  |
| 8"    |   | ◆◆ ○                           | ✓                 | ✓                 | ✓                | ✓                  |
| 10"   |   | ◆◆◆ ○                          | ✓                 | ✓                 | ✓                | ✓                  |
| 12"   |   | ◆◆◆ ○                          | ✓                 | ✓                 | ✓                | ✓                  |
| 14"   |   | ◆◆◆ ○                          | ✓                 | ✓                 | ✓                | ✓                  |
| 16"   |   | ◆◆◆ ○                          | ✓                 | ✓                 | ✓                | ✓                  |

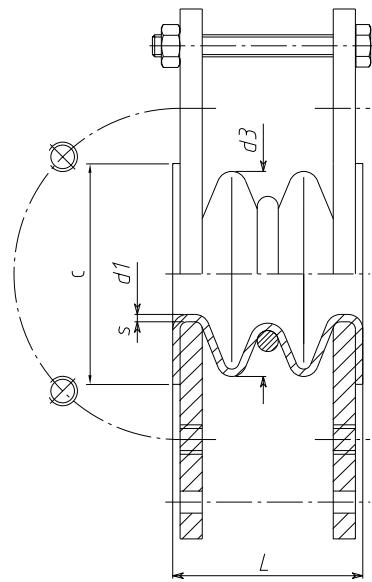
Standard

|  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ○ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

## 2 Convoluted PTFE SHD Expansion Joints with Reinforcing Rings

### Dimensional Data

| DN    | L<br>± 3%<br>(mm) | Thread<br>DIN 2501 | C<br>(mm) | S<br>min.<br>(mm) | S<br>max.<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-------|-------------------|--------------------|-----------|-------------------|-------------------|----------------------|----------------------|--------------------|
| 0.5"  | 36                | 4 x 1/2"           | 35        | 2                 | 5                 | 23                   | 41                   | 1,4                |
| 0.75" | 36                | 4 x 1/2"           | 43        | 2                 | 5                 | 23                   | 42                   | 1,5                |
| 1"    | 36                | 4 x 1/2"           | 51        | 2,25              | 5                 | 24                   | 43                   | 1,65               |
| 1.5"  | 39                | 4 x 1/2"           | 73        | 2,25              | 5                 | 36                   | 57                   | 2,55               |
| 2"    | 47                | 4 x 5/8"           | 92        | 2,25              | 5                 | 50                   | 75                   | 3,7                |
| 2.5"  | 51                | 4 x 5/8"           | 105       | 2,25              | 5                 | 60                   | 91                   | 4,5                |
| 3"    | 52                | 4 x 5/8"           | 127       | 2,75              | 6                 | 76                   | 104                  | 5,5                |
| 4"    | 64                | 8 x 5/8"           | 158       | 2,75              | 6                 | 100                  | 134                  | 7,4                |
| 5"    | 77                | 8 x 3/4"           | 186       | 2,75              | 6                 | 122                  | 163                  | 11,5               |
| 6"    | 72                | 8 x 3/4"           | 216       | 3                 | 6,75              | 150                  | 188                  | 13                 |
| 8"    | 92                | 8 x 3/4"           | 270       | 3,5               | 6,75              | 204                  | 250                  | 21,5               |
| 10"   | 135               | 12 x 7/8"          | 324       | 3,25              | 7                 | 255                  | 325                  | 26                 |
| 12"   | 135               | 12 x 7/8"          | 381       | 4                 | 7,5               | 280                  | 345                  | 35                 |
| 14"   | 150               | 12 x 1"            | 412       | 4,5               | 9                 | 335                  | 435                  | 56                 |
| 16"   | 156               | 16 x 1"            | 470       | 5                 | 10                | 390                  | 462                  | 74                 |



### Part Number System

|          |                                       |  |  |               |                              |           |         |   |
|----------|---------------------------------------|--|--|---------------|------------------------------|-----------|---------|---|
| 1        | K2W                                   | 250  | 15   | W             | P3                           | SS        | 00XX    |   |
| Type     | Fitting                               | Diameter   | Pressure   | Liner         | Resin Type                   | Flanges   | Options |   |
| Finished | SHD Expansion Joint with 2 Convolutes | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16" | 15 - ANSI 150 | W - White<br>E - Anti-Static | Paste SHD | SS      | 0017 - Standard 1.0038<br>0018 - Flanges 1.4541 |

## 3 Convoluted PTFE SHD Expansion Joints with Reinforcing Rings



| DN    | Value Series                  | Select Series | Options   |   |                   |                  |
|-------|-------------------------------|---------------|-----------|---|-------------------|------------------|
|       |                               |               | Class 150 | Option selection may affect manufacturing lead time. Consult factory for price and delivery |                   |                  |
|       | not available in Value Series |               |           | Flanges of 1.0038   | Flanges of 1.4541 | Conductive Liner |
| 0.5"  |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 0.75" |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 1"    |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 1.5"  |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 2"    |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 2.5"  |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 3"    |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 4"    |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 5"    |                               | ◆◆            | ●         | ✓   | ✓                 | ✓                |
| 6"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                |
| 8"    |                               | ◆◆            | ∅         | ✓   | ✓                 | ✓                |
| 10"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                |
| 12"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                |
| 14"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                |
| 16"   |                               | ◆◆◆           | ∅         | ✓   | ✓                 | ✓                |

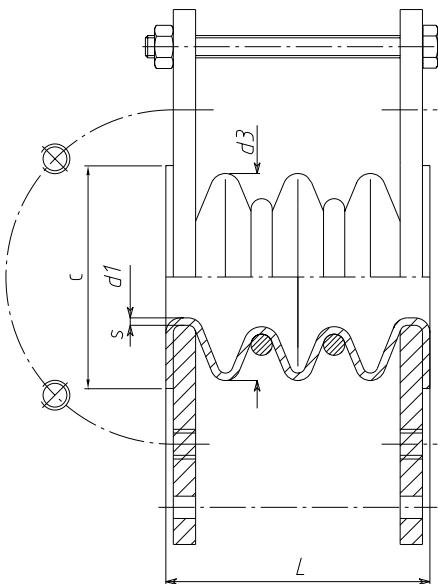
Standard

- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# 3 Convoluted PTFE SHD Expansion Joints with Reinforcing Rings

## Dimensional Data

| DN    | L<br>± 3%<br>(mm) | Thread    | C   | S<br>min.<br>(mm) | S<br>max.<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-------|-------------------|-----------|-----|-------------------|-------------------|----------------------|----------------------|--------------------|
| 0.5"  | 54                | 4 x 1/2"  | 35  | 2                 | 5                 | 23                   | 41                   | 1,5                |
| 0.75" | 54                | 4 x 1/2"  | 43  | 2                 | 5                 | 23                   | 42                   | 1,6                |
| 1"    | 54                | 4 x 1/2"  | 51  | 2,25              | 5                 | 24                   | 43                   | 1,7                |
| 1.5"  | 58                | 4 x 1/2"  | 73  | 2,25              | 5                 | 36                   | 57                   | 2,6                |
| 2"    | 69                | 4 x 5/8"  | 92  | 2,25              | 5                 | 50                   | 75                   | 3,8                |
| 2.5"  | 77                | 4 x 5/8"  | 105 | 2,25              | 5                 | 60                   | 91                   | 4,6                |
| 3"    | 78                | 4 x 5/8"  | 127 | 2,75              | 6                 | 76                   | 104                  | 5,6                |
| 4"    | 98                | 8 x 5/8"  | 158 | 2,75              | 6                 | 100                  | 134                  | 7,5                |
| 5"    | 117               | 8 x 3/4"  | 186 | 2,75              | 6                 | 122                  | 163                  | 11,6               |
| 6"    | 110               | 8 x 3/4"  | 216 | 3                 | 6,75              | 150                  | 188                  | 13,2               |
| 8"    | 140               | 8 x 3/4"  | 270 | 3,5               | 6,75              | 204                  | 250                  | 22                 |
| 10"   | 190               | 12 x 7/8" | 324 | 3,25              | 7                 | 255                  | 325                  | 26,5               |
| 12"   | 198               | 12 x 7/8" | 381 | 4                 | 7,5               | 280                  | 345                  | 36                 |
| 14"   | 194               | 12 x 1"   | 412 | 4,5               | 9                 | 335                  | 435                  | 58                 |
| 16"   | 233               | 16 x 1"   | 470 | 5                 | 10                | 390                  | 462                  | 76                 |



## Part Number System

|          |                                   |  |  |               |                              |           |         |   |
|----------|-----------------------------------|--|--|---------------|------------------------------|-----------|---------|---|
| 1        | K3W                               | 250  | 15   | W             | P3                           | SS        | 00XX    |   |
| Type     | Fitting                           | Diameter   | Pressure   | Liner         | Resin Type                   | Flanges   | Options |   |
| Finished | Expansion Joint with 3 Convolutes | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16" | 15 - ANSI 150 | W - White<br>E - Anti-Static | Paste SHD | SS      | 0017 - Standard 1.0038<br>0018 - Flanges 1.4541 |

## 5 Convoluted PTFE Expansion Joints with Reinforcing Rings



| DN    | Value Series                  | Select Series | Options   |  |                   |                  |
|-------|-------------------------------|---------------|-----------|--|-------------------|------------------|
|       |                               |               | Class 150 | <i>Option selection may affect manufacturing lead time. Consult factory for price and delivery</i> |                   |                  |
|       | not available in Value Series |               |           | Flanges of 1.0038  | Flanges of 1.4541 | Conductive Liner |
| 0.5"  |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 0.75" |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 1"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 1.5"  |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 2"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 2.5"  |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 3"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 4"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 5"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 6"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 8"    |                               | ◆◆ ○          |           | ✓  | ✓                 | ✓ ✓              |
| 10"   |                               | ◆◆◆ ○         |           | ✓  | ✓                 | ✓ ✓              |
| 12"   |                               | ◆◆◆ ○         |           | ✓  | ✓                 | ✓ ✓              |
| 14"   |                               | ◆◆◆ ○         |           | ✓  | ✓                 | ✓ ✓              |
| 16"   |                               | ◆◆◆ ○         |           | ✓  | ✓                 | ✓ ✓              |

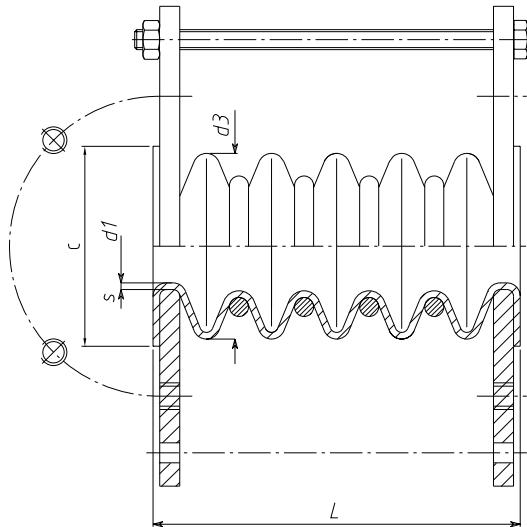
Standard

- ◆ Best Price & Lead Time (1 - 2 Weeks)
- ◆◆ Longer Lead Time (4 - 6 Weeks)
- ◆◆◆ Price and Delivery Upon Request
- Full Vacuum at 230 °C
- ∅ Reduced Vacuum Resistance at Elevated Temp.
- Non-Vacuum Rated

# 5 Convoluted PTFE Expansion Joints with Reinforcing Rings

## Dimensional Data

| DN    | L<br>± 2%<br>(mm) | Thread    | C<br>±10 %<br>(mm) | S<br>±10 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-------|-------------------|-----------|--------------------|--------------------|----------------------|----------------------|--------------------|
| 0.5"  | 65                | 4 x 1/2"  | 35                 | 3                  | 24                   | 43                   | 1,9                |
| 0.75" | 65                | 4 x 1/2"  | 43                 | 3                  | 24                   | 43                   | 1,9                |
| 1"    | 68                | 4 x 1/2"  | 51                 | 3                  | 24                   | 43                   | 1,9                |
| 1.5"  | 80                | 4 x 1/2"  | 73                 | 3                  | 36                   | 57                   | 2,7                |
| 2"    | 88                | 4 x 5/8"  | 92                 | 3                  | 50                   | 75                   | 4,3                |
| 2.5"  | 117               | 4 x 5/8"  | 105                | 3                  | 60                   | 91                   | 5                  |
| 3"    | 117               | 4 x 5/8"  | 127                | 3,5                | 76                   | 104                  | 5,4                |
| 4"    | 139               | 8 x 5/8"  | 158                | 4                  | 100                  | 134                  | 7,1                |
| 5"    | 167               | 8 x 3/4"  | 186                | 4,25               | 122                  | 163                  | 12                 |
| 6"    | 153               | 8 x 3/4"  | 216                | 4,5                | 150                  | 188                  | 14,2               |
| 8"    | 207               | 8 x 3/4"  | 270                | 5,25               | 204                  | 250                  | 22                 |
| 10"   | 300               | 12 x 7/8" | 324                | 5,25               | 255                  | 325                  | 29                 |
| 12"   | 288               | 12 x 7/8" | 381                | 5,5                | 280                  | 345                  | 40                 |
| 14"   | 325               | 12 x 1"   | 412                | 6                  | 350                  | 438                  | 65                 |
| 16"   | 343               | 16 x 1"   | 470                | 6,5                | 390                  | 462                  | 81                 |



## Part Number System

|          |                                   |  |  |              |                              |                |  |
|----------|-----------------------------------|--|--|--------------|------------------------------|----------------|--|
| 1        | K5W                               | 250  | 15   | W            | P1                           | SS             | 00XX   |
| Type     | Fitting                           | Diameter   | Pressure   | Liner        | Resin Type                   | Flanges        | Options  |
| Finished | Expansion Joint with 5 Convolutes | 015 - 1/2"<br>020 - 3/4"<br>025 - 1"<br>040 - 1 1/2"<br>050 - 2"<br>080 - 3"<br>100 - 4"<br>150 - 6" | 200 - 8"<br>250 - 10"<br>300 - 12"<br>350 - 14"<br>400 - 16" | 15 - ANSI 15 | W - White<br>E - Anti-Static | Paste Standard | SS<br>0017 - Standard 1.0038<br>0018 - Flansche 1.4541 |

# PTFE-Expansion Joints with SS Housing and Spacer Bead

*TEFLON® by DuPont*

*DN 1.25" - 6"*



| DN    | Value Series                  | Select Series |   |  |   |                  |           |
|-------|-------------------------------|---------------|---|--|---|------------------|-----------|
|       |                               | Class 150     |   | Option selection may affect manufacturing lead time.<br>Consult factory for price and delivery |   |                  |           |
|       | not available in Value Series |               |   | Flanges of 1.0038  | ✓ | Flanges 1.4541   | ✓         |
| 1.25" |                               | ◆◆◆           | ∅ | Bellow of Hastelloy C4   | ✓ | Conductive Liner | ✓         |
| 1.5"  |                               | ◆◆◆           | ∅ | Bellow of 1.4541   | ✓ |                  | Class 300 |
| 2"    |                               | ◆◆◆           | ∅ | Standard   | ✓ | ✓                | ✓         |
| 2.5"  |                               | ◆◆◆           | ∅ | Standard   | ✓ | ✓                | ✓         |
| 3"    |                               | ◆◆◆           | ∅ | Standard   | ✓ | ✓                | ✓         |
| 4"    |                               | ◆◆◆           | ∅ | Standard   | ✓ | ✓                | ✓         |
| 5"    |                               | ◆◆◆           | ∅ | Standard   | ✓ | ✓                | ✓         |
| 6"    |                               | ◆◆◆           | ∅ | Standard   | ✓ | ✓                | ✓         |

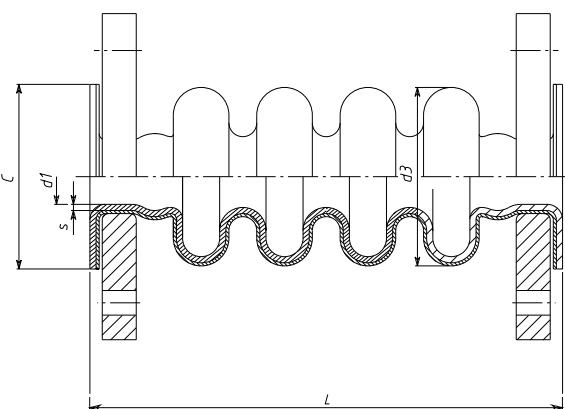
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE-Expansion Joints with SS Housing and Spacer Bead

DN 1.25" - 6"

Dimensional Data per Class 150

| DN   | L<br>+ 5%<br>- 1,5%<br>(mm) | S<br>± 10 %<br>(mm) | C<br>± 5 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|------|-----------------------------|---------------------|--------------------|----------------------|----------------------|--------------------|
| 1.25 | 144                         | 3                   | 70                 | 35                   | 61                   | 3,9                |
|      | 218                         | 3                   | 70                 | 35                   | 61                   | 4,1                |
| 1.5" | 156                         | 4                   | 80                 | 44                   | 77                   | 4,5                |
|      | 240                         | 4                   | 80                 | 44                   | 77                   | 4,8                |
| 2"   | 178                         | 4                   | 92                 | 56                   | 89                   | 5,7                |
|      | 291                         | 4                   | 92                 | 56                   | 89                   | 6,5                |
| 2.5" | 179                         | 4                   | 107                | 72                   | 108                  | 6,9                |
|      | 282                         | 4                   | 107                | 72                   | 108                  | 7,9                |
| 3"   | 183                         | 4                   | 122                | 84                   | 124                  | 8                  |
|      | 271                         | 4                   | 122                | 84                   | 124                  | 9                  |
| 4"   | 175                         | 4,5                 | 147                | 107                  | 151                  | 10                 |
|      | 259                         | 4,5                 | 147                | 107                  | 151                  | 11                 |
| 5"   | 216                         | 4,5                 | 178                | 126                  | 181                  | 14                 |
|      | 353                         | 4,5                 | 178                | 126                  | 181                  | 17                 |
| 6"   | 243                         | 5                   | 208                | 154                  | 212                  | 18                 |
|      | 378                         | 5                   | 208                | 154                  | 212                  | 23                 |



## Part Number System

| 1  | EKS     | 100  | 15                             | W                            | XX              | LLL1   | XX   |
|--|---------|--|--------------------------------|------------------------------|-----------------|--|--|
| Type   | Fitting | Diameter   | Pressure                       | Liner                        | Resin Type      | Flanges  | Options                                    |
| Finished<br>Stainless<br>Steel<br>Expansion<br>Joint |         | 032 - 1.25" 200 - 8"<br>040 - 1.5" 250 - 10"<br>050 - 2" 300 - 12"<br>065 - 2.5" 350 - 14"<br>080 - 3" 400 - 16"<br>100 - 4" 450 - 18"<br>125 - 5" 500 - 20"<br>150 - 6" 600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | LLL1 - loose /loose<br>- Length 1<br>LLL2 - loose /loose<br>- Length 2 | 26 - Flanges 1.0038<br>27 - Flanges 1.4541 |

# PTFE-Expansion Joints with SS Housing and Spacer Bead

*TEFLON® by DuPont*

*DN 8" - 24"*



| DN  | Value Series                  | Select Series |   |  |   |   |   |
|-----|-------------------------------|---------------|---|--|---|---|---|
|     |                               | Class 150     |   | Option selection may affect manufacturing lead time.<br>Consult factory for price and delivery |   |   |   |
|     | not available in Value Series |               |   | Flanges of 1.0038  | ✓ | ✓ | ✓ |
| 8"  |                               | ◆◆◆           | ∅ | Flanges 1.4541   | ✓ | ✓ | ✓ |
| 10" |                               | ◆◆◆           | ∅ | Bellow of Hastelloy C4   | ✓ | ✓ | ✓ |
| 12" |                               | ◆◆◆           | ∅ | Conductive Liner   | ✓ | ✓ | ✓ |
| 14" |                               | ◆◆◆           | ∅ | Class 300  | ✓ | ✓ | ✓ |
| 16" |                               | ◆◆◆           | ∅ |  |   |   |   |
| 18" |                               | ◆◆◆           | ∅ |  |   |   |   |
| 20" |                               | ◆◆◆           | ○ |  |   |   |   |
| 24" |                               | ◆◆◆           | ○ |  |   |   |   |

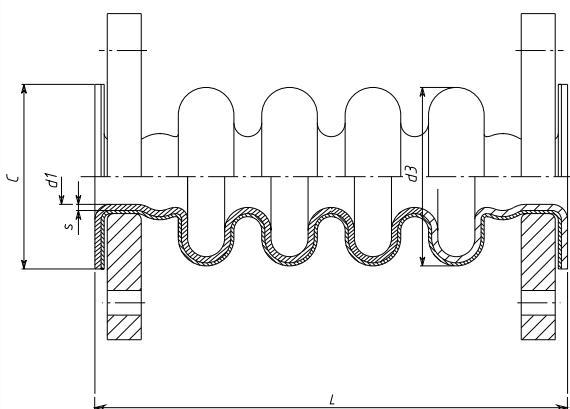
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE-Expansion Joints with SS Housing and Spacer Bead

*DN 8" - 24"*

Dimensional Data per Class 150

| DN  | L<br>+ 5%<br>- 1,5%<br>(mm) | S<br>± 10 %<br>(mm) | C<br>± 5 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-----|-----------------------------|---------------------|--------------------|----------------------|----------------------|--------------------|
| 8"  | 241                         | 5                   | 258                | 204                  | 265                  | 25                 |
|     | 408                         | 5                   | 258                | 204                  | 265                  | 33                 |
| 10" | 237                         | 5                   | 320                | 258                  | 324                  | 32                 |
|     | 381                         | 5                   | 320                | 258                  | 324                  | 38                 |
| 12" | 280                         | 6                   | 370                | 306                  | 376                  | 40                 |
|     | 416                         | 6                   | 370                | 306                  | 376                  | 51                 |
| 14" | 289                         | 6,25                | 410                | 337                  | 408                  | 56                 |
|     | 396                         | 6,25                | 410                | 337                  | 408                  | 66                 |
| 16" | 283                         | 6,25                | 465                | 387                  | 461                  | 74                 |
|     | 421                         | 6,25                | 465                | 387                  | 461                  | 85                 |
| 18" | 320                         | 6,25                | 520                | 438                  | 516                  | 85                 |
|     | 517                         | 6,25                | 520                | 438                  | 516                  | 113                |
| 20" | 303                         | 6,25                | 570                | 489                  | 570                  | 104                |
|     | 493                         | 6,25                | 570                | 489                  | 570                  | 129                |
| 24" | 324                         | 4,5                 | 670                | 594                  | 678                  | 126                |
|     | 464                         | 4,5                 | 670                | 594                  | 678                  | 144                |



## Part Number System

|  |         |  |                                |                              |                 |  |  |
|--|---------|--|--------------------------------|------------------------------|-----------------|--|--|
| 1  | EKS     | 250  | 15                             | W                            | XX              | LLL1   | XX   |
| Type   | Fitting | Diameter   | Pressure                       | Liner                        | Resin Type      | Flanges  | Options                                    |
| Finished<br>Stainless<br>Steel<br>Expansion<br>Joint |         | 032 - 1.25" 200 - 8"<br>040 - 1.5" 250 - 10"<br>050 - 2" 300 - 12"<br>065 - 2.5" 350 - 14"<br>080 - 3" 400 - 16"<br>100 - 4" 450 - 18"<br>125 - 5" 500 - 20"<br>150 - 6" 600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | LLL1 - loose /loose<br>- Length 1<br>LLL2 - loose /loose<br>- Length 2 | 26 - Flanges 1.0038<br>27 - Flanges 1.4541 |

# PTFE-Expansion Joints with SS Housing and Spacer Bead (ANSI Class 300)

*TEFLON® by DuPont*

*DN 1.25" - 6"*



| DN    | Value Series                  | Select Series |   |  |   |   |   |
|-------|-------------------------------|---------------|---|--|---|---|---|
|       |                               | Class 300     |   | Option selection may affect manufacturing lead time.<br>Consult factory for price and delivery |   |   |   |
|       | not available in Value Series |               |   | Flanges of 1.0038  | ✓ | ✓ | ✓ |
| 1.25" |                               | ◆◆◆           | ∅ | Flanges 1.4541   | ✓ | ✓ | ✓ |
| 1.5"  |                               | ◆◆◆           | ∅ | Bellow of Hastelloy C4   | ✓ | ✓ | ✓ |
| 2"    |                               | ◆◆◆           | ∅ | Conductive Liner   | ✓ | ✓ | ✓ |
| 2.5"  |                               | ◆◆◆           | ∅ | Class 150  | ✓ | ✓ | ✓ |
| 3"    |                               | ◆◆◆           | ∅ |  |   |   |   |
| 4"    |                               | ◆◆◆           | ∅ |  |   |   |   |
| 5"    |                               | ◆◆◆           | ∅ |  |   |   |   |
| 6"    |                               | ◆◆◆           | ∅ |  |   |   |   |

Standard

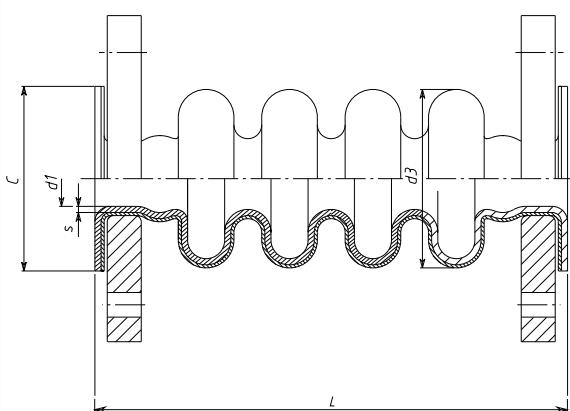
- ◆ Best Price & Lead Time (1 - 2 Weeks)
- ◆◆ Longer Lead Time (4 - 6 Weeks)
- ◆◆◆ Price and Delivery Upon Request
- Full Vacuum at 230 °C
- ∅ Reduced Vacuum Resistance at Elevated Temp.
- Non-Vacuum Rated

# PTFE-Expansion Joints with SS Housing and Spacer Bead (ANSI Class 300)

DN 1.25" - 6"

Dimensional Data per Class 300

| DN   | L<br>+ 5%<br>- 1,5%<br>(mm) | S<br>± 10 %<br>(mm) | C<br>± 5 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|------|-----------------------------|---------------------|--------------------|----------------------|----------------------|--------------------|
| 1.25 | 145                         | 3                   | 70                 | 35                   | 61                   | 4                  |
|      | 205                         | 3                   | 70                 | 35                   | 61                   | 4.2                |
| 1.5" | 162                         | 4                   | 80                 | 44                   | 77                   | 4.6                |
|      | 261                         | 4                   | 80                 | 44                   | 77                   | 5.2                |
| 2"   | 200                         | 4                   | 92                 | 56                   | 89                   | 6                  |
|      | 305                         | 4                   | 92                 | 56                   | 89                   | 7.2                |
| 2.5" | 195                         | 4                   | 107                | 72                   | 108                  | 7.7                |
|      | 277                         | 4                   | 107                | 72                   | 108                  | 8.9                |
| 3"   | 209                         | 4                   | 122                | 84                   | 124                  | 10                 |
|      | 299                         | 4                   | 122                | 84                   | 124                  | 11                 |
| 4"   | 212                         | 4.5                 | 147                | 107                  | 151                  | 13                 |
|      | 314                         | 4.5                 | 147                | 107                  | 151                  | 16                 |
| 5"   | 211                         | 4.5                 | 178                | 126                  | 181                  | 19                 |
|      | 286                         | 4.5                 | 178                | 126                  | 181                  | 21                 |
| 6"   | 251                         | 5                   | 208                | 154                  | 212                  | 23                 |
|      | 359                         | 5                   | 208                | 154                  | 212                  | 28                 |



Part Number System

| 1  | EKS     | 100  | 30                             | W                            | XX              | LLL1   | XX   |
|--|---------|--|--------------------------------|------------------------------|-----------------|--|--|
| Type   | Fitting | Diameter   | Pressure                       | Liner                        | Resin Type      | Flanges  | Options                                    |
| Finished<br>Stainless<br>Steel<br>Expansion<br>Joint |         | 032 - 1.25" 200 - 8"<br>040 - 1.5" 250 - 10"<br>050 - 2" 300 - 12"<br>065 - 2.5" 350 - 14"<br>080 - 3" 400 - 16"<br>100 - 4" 450 - 18"<br>125 - 5" 500 - 20"<br>150 - 6" 600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | LLL1 - loose /loose<br>- Length 1<br>LLL2 - loose /loose<br>- Length 2 | 26 - Flanges 1.0038<br>27 - Flanges 1.4541 |

# PTFE-Expansion Joints with SS Housing and Spacer Bead (ANSI Class 300)

*TEFLON® by DuPont*

DN 8" - 24"



| DN  | Value Series                  | Select Series |   |  |   |   |   |
|-----|-------------------------------|---------------|---|--|---|---|---|
|     |                               | Class 300     |   | Option selection may affect manufacturing lead time.<br>Consult factory for price and delivery |   |   |   |
|     | not available in Value Series |               |   | Flanges of 1.0038  | ✓ | ✓ | ✓ |
| 8"  |                               | ◆◆◆           | ∅ | Flanges 1.4541   | ✓ | ✓ | ✓ |
| 10" |                               | ◆◆◆           | ∅ | Bellow of Hastelloy C4   | ✓ | ✓ | ✓ |
| 12" |                               | ◆◆◆           | ∅ | Conductive Liner   | ✓ | ✓ | ✓ |
| 14" |                               | ◆◆◆           | ∅ | Class 150  | ✓ | ✓ | ✓ |
| 16" |                               | ◆◆◆           | ∅ |  |   |   |   |
| 18" |                               | ◆◆◆           | ∅ |  |   |   |   |
| 20" |                               | ◆◆◆           | ○ |  |   |   |   |
| 24" |                               | ◆◆◆           | ○ |  |   |   |   |

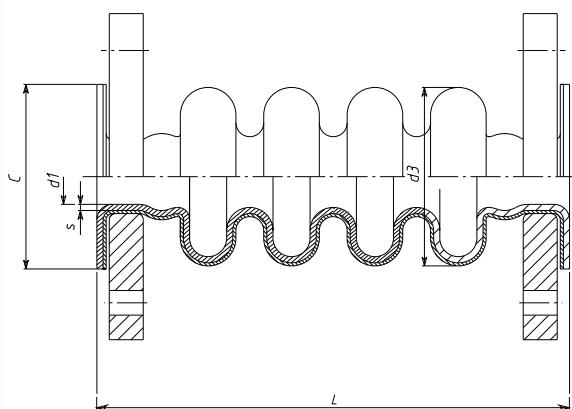
- |  |   |
|--|---|
| ◆ Best Price & Lead Time (1 - 2 Weeks) | ● Full Vacuum at 230 °C                       |
| ◆◆ Longer Lead Time (4 - 6 Weeks)      | ∅ Reduced Vacuum Resistance at Elevated Temp. |
| ◆◆◆ Price and Delivery Upon Request    | ○ Non-Vacuum Rated                            |

# PTFE-Expansion Joints with SS Housing and Spacer Bead (ANSI Class 300)

DN 8" - 24"

Dimensional Data per Class 300

| DN  | L<br>+ 5%<br>- 1,5%<br>(mm) | S<br>± 10 %<br>(mm) | C<br>± 5 %<br>(mm) | d 1<br>± 5 %<br>(mm) | d 3<br>± 5 %<br>(mm) | Weight<br>(ca. kg) |
|-----|-----------------------------|---------------------|--------------------|----------------------|----------------------|--------------------|
| 8"  | 235                         | 5                   | 258                | 204                  | 265                  | 36                 |
|     | 319                         | 5                   | 258                | 204                  | 265                  | 40                 |
| 10" | 264                         | 5                   | 320                | 258                  | 324                  | 51                 |
|     | 357                         | 5                   | 320                | 258                  | 324                  | 57                 |
| 12" | 287                         | 6                   | 375                | 306                  | 376                  | 71                 |
|     | 391                         | 6                   | 375                | 306                  | 376                  | 80                 |
| 14" | 300                         | 6,25                | 410                | 337                  | 408                  | 103                |
|     | 406                         | 6,25                | 410                | 337                  | 408                  | 112                |
| 16" | 323                         | 6,25                | 465                | 387                  | 461                  | 128                |
|     | 477                         | 6,25                | 465                | 387                  | 461                  | 146                |
| 18" | 368                         | 6,25                | 520                | 438                  | 516                  | 155                |
|     | 524                         | 6,25                | 520                | 438                  | 516                  | 179                |
| 20" | 333                         | 6,25                | 570                | 489                  | 570                  | 173                |
|     | 493                         | 6,25                | 570                | 489                  | 570                  | 201                |
| 24" | 329                         | 4,5                 | 670                | 594                  | 678                  | 220                |
|     | 485                         | 4,5                 | 670                | 594                  | 678                  | 250                |



Part Number System

| 1  | EKS     | 250  | 30                             | W                            | XX              | LLL1   | XX   |
|--|---------|--|--------------------------------|------------------------------|-----------------|--|--|
| Type   | Fitting | Diameter   | Pressure                       | Liner                        | Resin Type      | Flanges  | Options                                    |
| Finished<br>Stainless<br>Steel<br>Expansion<br>Joint |         | 032 - 1.25" 200 - 8"<br>040 - 1.5" 250 - 10"<br>050 - 2" 300 - 12"<br>065 - 2.5" 350 - 14"<br>080 - 3" 400 - 16"<br>100 - 4" 450 - 18"<br>125 - 5" 500 - 20"<br>150 - 6" 600 - 24" | 15 - ANSI 150<br>30 - ANSI 300 | W - White<br>E - Anti-Static | Factory Defined | LLL1 - loose /loose<br>- Length 1<br>LLL2 - loose /loose<br>- Length 2 | 26 - Flanges 1.0038<br>27 - Flanges 1.4541 |