

PTFE Lined Pipe and Fittings



 上品綜合工業股份有限公司
ALLIED SUPREME CORP.

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SPECIFICATION FOR PTFE LINED PIPE AND FITTING

1. SCOPE

- 1.1 This specification covers Polytetrafluoroethylene (PTFE) line pipe & fittings applied for conveying corrosive fluids. The contents include the requirement for construction of materials, dimensions together with standard test procedure.
- 1.2 This specification covers ANSI 150lbs & JIS 10K PTFE lined pipe, flange and fittings in nominal diameters from 1/2" to 12".
- 1.3 The PTFE lined flange, pipe and fitting assemblies are limited for use from -28° C to 260° C. Temperature limitations are based on non-corrosive test condition, and temperature limitation may be changed by aggressive environment.

2. CONSTRUCTION OF MATERIALS

2.1 THE PROPERTIES OF PTFE

2.1.1 Temperature limitation

Maximum continuous service temperature: 260° C

Melt point: 327° C

2.1.2 Chemical inertness

Resist to most of all chemicals. Please consult our sales engineer or details information.

2.1.3 Coefficient of friction

Static coefficient of friction: 0.10

Kinetic coefficient of friction 0.05

2.1.4 Specific gravity ASTM D792 2.14 ~ 2.2

2.1.5 Tensile strength ASTM D638 280 ~ 350 kg/cm²

2.1.6 Non-stick

Surface tension 18.5 dyne/cm

Contact angle

Water 104° ~ 111°

Hexadecane 37° ~ 45°

PTFE lined pipe and fittings

| | | |
|------------------------|-----------|------------|
| 2.1.7 Elongation | ASTM D638 | 100 ~ 300% |
| 2.1.8 Water absorption | ASTM D570 | < 0.01% |

2.2 PTFE LINING

2.2.1 The lining is made from Polytetrafluoroethylene resins conforming to the requirement of specification ASTM D1457 and including less than 1 % weight of additives.

2.2.2 Specific gravity

The lining made from PTFE resin meeting specification ASTM D792 shall have a specific gravity from 2.14 to 2.2

2.3 HOUSING

2.3.1 Pipe and fitting

The carbon steel pipe and fittings are welded or made of seamless steel, conforming to Schedule 40 or Schedule 20. For nominal diameter 1" to 8" Schedule 40 is used, Schedule 20 is used for diameter over 10".

Materials specifications supplied as standard are:

| | | |
|---------|-----------------|-----------|
| Pipe | Carbon steel | ASTM A53 |
| | Stainless steel | ASTM A312 |
| Fitting | Carbon steel | ASTM A234 |
| | Stainless steel | ASTM A403 |

2.3.2 Flange

Flange is fabricated from materials conforming to one of the following specification.

| | |
|-----------------|-----------|
| Carbon steel | ASTM A105 |
| Stainless steel | ASTM A182 |

2.3.3 Welding

All fusion welding is done complying with provisions of Section IX of the ASME Boiler & Pressure Vessel Code.

2.3.4 Finish

The interior surfaces of all housing are clean and free of mold burrs, rust, scale or others that may adversely affect the performance of lining.

3. DESIGN REQUIREMENTS

3.1 DIMENSION

3.1.1 Nominal PTFE liner thickness of piping Unit: mm

| Size | 1" | 1-1/2" | 2" | 3" | 4" | 6" | 8" | 10" | 12" |
|---------------|----|--------|----|----|-----|-----|-----|-----|-----|
| Standard Wall | 3 | 3 | 3 | 3 | 3.5 | 4.5 | 4.5 | 5 | 5 |
| Heavy Wall | 4 | 4 | 4 | 5 | 5.5 | 6.5 | 8.5 | 9 | 10 |

Note: Different PTFE liner thickness and under 4" PFA lined pipe are upon request.

3.1.2 PTFE wall thickness of fittings

| | | | |
|------------------|------------|-----------------|------|
| Nominal diameter | 1/2" to 4" | Liner thickness | 3 mm |
| | 6" to 8" | | 4 mm |
| | 10" to 12" | | 5 mm |

3.1.3 Standard flare diameter

| | | | | | | | | | | | | |
|----------------|------|------|----|--------|----|--------|-----|-----|-----|-----|-----|-----|
| Nominal | 15 | 20 | 25 | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 |
| Diameter | 1/2" | 3/4" | 1" | 1-1/2" | 2" | 2-1/2" | 3" | 4" | 6" | 8" | 10" | 12" |
| Flare Diameter | 32 | 40 | 48 | 68 | 87 | 100 | 117 | 151 | 203 | 256 | 311 | 365 |

3.1.4 Tolerances:

Tolerance of pipe, flange and fitting are specified as follows:

3.1.4.1 Pipe

| | |
|----------------------------|-----------------------|
| Length | +/- 1/8" (+/- 3.2 mm) |
| Flange bolt hole alignment | +/- 1/16" (+/- 1.6mm) |

3.1.4.2 Flange

See ANSI B16.5

3.1.4.3 Fitting

See ANSI B16.5

3.2 VENT HOLE

Each pipe & fitting is provided with a venting system that will release any gas between the liner and the housing. Each pipe will have at least 2 vent holes in diameter 0.12" (3mm), located 2" (50mm) from the ends. Each fitting shall have two vent holes at least. Reducing flange has no vent hole.

4. INSPECTION REQUIREMENT

4.1 HYDROSTATIC PRESSURE TEST

The internal test pressure is 150% of maximum recommended working pressure. Reach full test pressure within 1 min. and maintain for 3 min.

4.2 ELECTROSTATIC TEST

Conduct the test with a non-destructive high-voltage tester at an output voltage of 10,000V. A visible or audible spark or both that occurs at the probe when electrical contact is made because of a defect in the liner, shall be cause for rejection.

4.3 VISUAL INSPECTION, PAINTING INSPECTION

All surfaces are free from blister, porosity and other defects. Any defect has to be repaired before shipment. After visual inspection, the external part of pipe, fittings coated with epoxy primer 1 coat.

5. STORAGE, TRANSPORT & IDENTIFICATION

5.1 STORAGE

The faces of each end are protected by wooden plate. So that products are capable of withstanding normal handling during transport.

5.2 MARKING

The markings shall be applied to the pipe, fitting with manufacturers name, order number.

5.3 TRANSPORT

All items are supplied with stout wooden case or export carton depend on the weight, measurement ordered.

PTFE Lined Pipe



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | C | t | | L(Min.) | L(Max.) | G.W. (kg) |
|--------------|-----|-----|----|----------|-------|---------|---------|--------------|
| Inch | mm | | | Standard | Heavy | | | |
| 1" | 25 | 48 | 10 | 3.0 | 4.0 | 100 | 6000 | 2.99×M+1.8 |
| 1-1/2" | 40 | 68 | 10 | 3.0 | 4.0 | 100 | 6000 | 4.84×M+3.1 |
| 2" | 50 | 87 | 10 | 3.0 | 4.0 | 150 | 6000 | 6.47×M+4.6 |
| 3" | 80 | 117 | 15 | 3.0 | 5.0 | 150 | 6000 | 12.83×M+8.7 |
| 4" | 100 | 151 | 15 | 3.5 | 5.5 | 150 | 6000 | 18.46×M+12.4 |
| 6" | 150 | 203 | 20 | 4.5 | 6.5 | 150 | 6000 | 32.91×M+17.6 |
| 8" | 200 | 256 | 20 | 4.5 | 8.5 | 200 | 6000 | 48.72×M+26.8 |
| 10" | 250 | 311 | 25 | 5.0 | 9.0 | 200 | 6000 | 50.60×M+37.5 |
| 12" | 300 | 365 | 25 | 5.0 | 10.0 | 200 | 6000 | 60.30×M+62 |

Pipe: ASTM A53 grade B, in compliance with ANSI B36.10

Steel pipe: according to SCH 40 up to 8", according to SCH 20 from 10" to 12"

Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: one loose flange, one fixed flange; two fixed flanges or two loose flanges are on request.

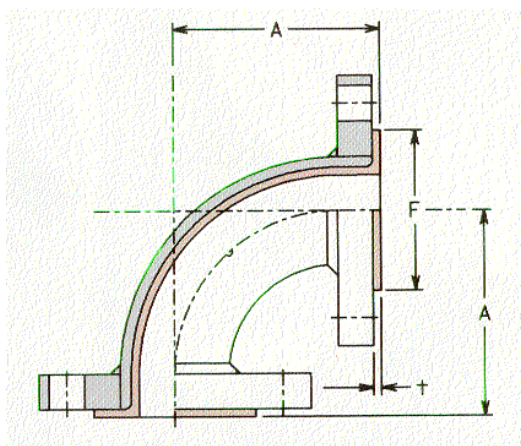
Lining: pure PTFE in compliance with ASTM D1457, different PTFE liner thickness and under 4" PFA lined pipe is on request.

Gross weight is in accordance with PTFE standard wall liner.

Other nominal sizes are available on request.

PTFE lined pipe and fittings

PTFE Lined 90° Elbow



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | A | t | G.W. (kg) |
|--------------|-----|-----|-----|---|-----------|
| Inch | mm | | | | |
| 1/2" | 15 | 32 | 70 | 3 | 1.2 |
| 3/4" | 20 | 40 | 80 | 3 | 1.8 |
| 1" * | 25 | 48 | 89 | 3 | 3.0 |
| 1-1/2" * | 40 | 68 | 102 | 3 | 4.0 |
| 2" * | 50 | 87 | 114 | 3 | 7.0 |
| 2-1/2" | 65 | 100 | 127 | 3 | 9.8 |
| 3" * | 80 | 117 | 140 | 3 | 11.8 |
| 4" * | 100 | 151 | 165 | 3 | 16.2 |
| 6" | 150 | 203 | 203 | 4 | 26.0 |
| 8" | 200 | 256 | 228 | 4 | 44.0 |
| 10" | 250 | 311 | 280 | 5 | 67.0 |
| 12" | 300 | 365 | 305 | 5 | 100.0 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel bend: according to SCH 40.

Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: two fixed flanges; two loose flanges or one loose and one fixed flange are on request.

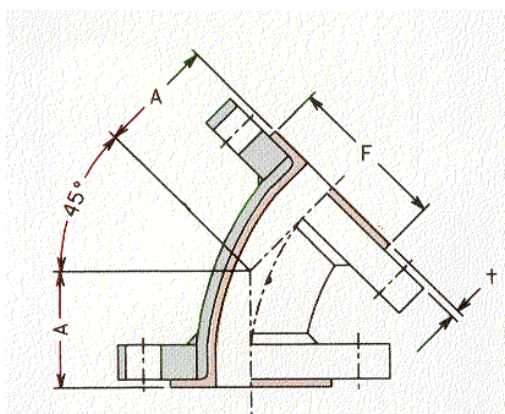
*: Ductile iron ASTM A395 and ASTM A 234 Gr. WPB are both available.

Lining: pure PTFE in compliance with ASTM D1457, under 4" PFA lined elbow is on request.

Other nominal sizes are available on request.

PTFE lined pipe and fittings

PTFE Lined 45° Elbow



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | A | t | G.W. (kg) |
|--------------|-----|-----|-----|---|-----------|
| Inch | mm | | | | |
| 1/2" | 15 | 32 | 45 | 3 | 1.0 |
| 3/4" | 20 | 40 | 45 | 3 | 1.6 |
| 1" | 25 | 48 | 45 | 3 | 2.2 |
| 1-1/2" | 40 | 68 | 58 | 3 | 3.6 |
| 2" | 50 | 87 | 64 | 3 | 4.8 |
| 2-1/2" | 65 | 100 | 76 | 3 | 8.4 |
| 3" | 80 | 117 | 76 | 3 | 10.5 |
| 4" | 100 | 151 | 102 | 3 | 14.6 |
| 6" | 150 | 203 | 127 | 4 | 25.1 |
| 8" | 200 | 256 | 140 | 4 | 40.5 |
| 10" | 250 | 311 | 165 | 5 | 56.0 |
| 12" | 300 | 365 | 191 | 5 | 88.0 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel bend: according to SCH 40.

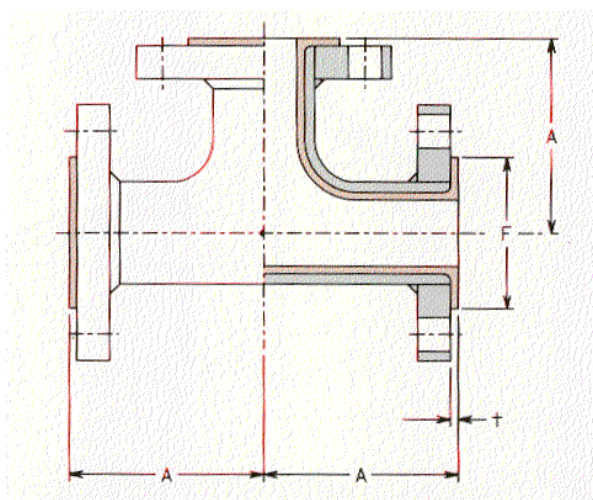
Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: two fixed flanges; one loose flange and one fixed flange or two loose flanges are on request.

Lining: pure PTFE in compliance with ASTM D1457, under 4" PFA lined elbow is on request.

Other nominal sizes are available on request.

PTFE Lined Equal Tee



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | A | t | G.W. (kg) |
|--------------|-----|-----|-----|---|-----------|
| Inch | mm | | | | |
| 1" * | 25 | 48 | 89 | 3 | 3.4 |
| 1-1/2" | 40 | 68 | 102 | 3 | 6.0 |
| 2" * | 50 | 87 | 114 | 3 | 9.8 |
| 2-1/2" | 65 | 100 | 127 | 3 | 14.2 |
| 3" * | 80 | 117 | 140 | 3 | 16.6 |
| 4" * | 100 | 151 | 165 | 3 | 25.8 |
| 6" | 150 | 203 | 203 | 4 | 41.2 |
| 8" | 200 | 256 | 228 | 4 | 58.0 |
| 10" | 250 | 311 | 280 | 5 | 104.0 |
| 12" | 300 | 365 | 305 | 5 | 146.2 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel tee piece: according to SCH 40.

Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

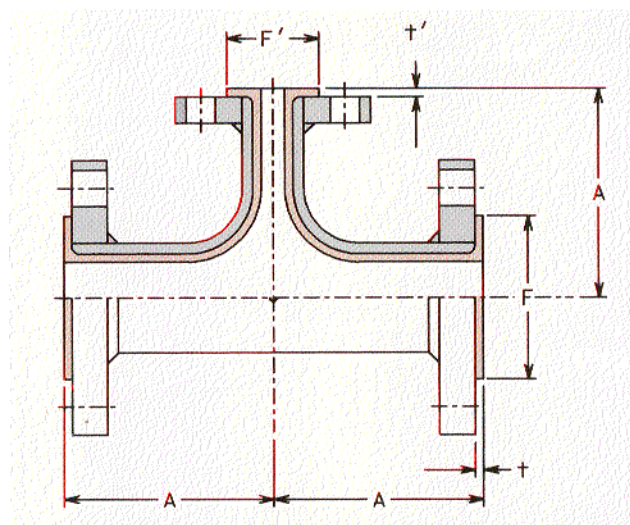
Standard: three fixed flanges; three loose flanges or one loose and two fixed flanges or two loose flanges and one fixed are on request.

*: Ductile iron ASTM A395 and ASTM A234 Gr. WPB are both available.

Lining: pure PTFE in compliance with ASTM D1457, under 4" PFA lined tee is on request.

Other nominal sizes are available on request.

PTFE Lined Reducing Tee



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | F' | A | t | t' | G.W. (kg) |
|-----------------|--------|-----|-----|-----|---|----|-----------|
| Inch | mm | | | | | | |
| 1-1/2" x 1" | 40x25 | 68 | 48 | 102 | 3 | 3 | 5.2 |
| 2" x 1" | 50x25 | 87 | 48 | 114 | 3 | 3 | 7.2 |
| 2" x 1-1/2" | 50x40 | 87 | 68 | 114 | 3 | 3 | 7.8 |
| 2-1/2" x 1" | 65x25 | 100 | 48 | 127 | 3 | 3 | 11.1 |
| 2-1/2" x 1-1/2" | 65x40 | 100 | 68 | 127 | 3 | 3 | 11.8 |
| 2-1/2" x 2" | 65x50 | 100 | 87 | 127 | 3 | 3 | 12.6 |
| 3" x 1" | 80x25 | 117 | 48 | 140 | 3 | 3 | 13.8 |
| 3" x 1-1/2" | 80x40 | 117 | 68 | 140 | 3 | 3 | 14.0 |
| 3" x 2" | 80x50 | 117 | 87 | 140 | 3 | 3 | 15.4 |
| 4" x 1" | 100x25 | 151 | 48 | 165 | 3 | 3 | 19.0 |
| 4" x 1-1/2" | 100x40 | 151 | 68 | 165 | 3 | 3 | 19.8 |
| 4" x 2" | 100x50 | 151 | 87 | 165 | 3 | 3 | 21.0 |
| 4" x 3" | 100x80 | 151 | 117 | 165 | 3 | 3 | 23.0 |

| Nominal size | | F | F' | A | t | t' | G.W. (kg) |
|--------------|---------|-----|-----|-----|---|----|-----------|
| Inch | mm | | | | | | |
| 6" x2" | 150x50 | 203 | 87 | 203 | 4 | 3 | 32.0 |
| 6" x2-1/2" | 150x65 | 203 | 100 | 203 | 4 | 3 | 33.0 |
| 6" x3" | 150x80 | 203 | 117 | 203 | 4 | 3 | 35.2 |
| 6" x4" | 150x100 | 203 | 151 | 203 | 4 | 3 | 37.0 |
| 8" x3" | 200x80 | 256 | 117 | 228 | 4 | 4 | 54.5 |
| 8" x4" | 200x100 | 256 | 151 | 228 | 4 | 3 | 56.0 |
| 8" x6" | 200x150 | 256 | 203 | 228 | 4 | 4 | 62.5 |
| 10" x4" | 250x100 | 311 | 151 | 280 | 5 | 3 | 79.3 |
| 10" x6" | 250x150 | 311 | 203 | 280 | 5 | 4 | 81.7 |
| 10" x8" | 250x200 | 311 | 256 | 280 | 5 | 4 | 89.4 |
| 12" x6" | 300x150 | 365 | 203 | 305 | 5 | 4 | 131.0 |
| 12" x8" | 300x200 | 365 | 256 | 305 | 5 | 4 | 134.0 |
| 12" x10 | 300x250 | 365 | 311 | 305 | 5 | 5 | 141.0 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel tee piece: according to SCH 40.

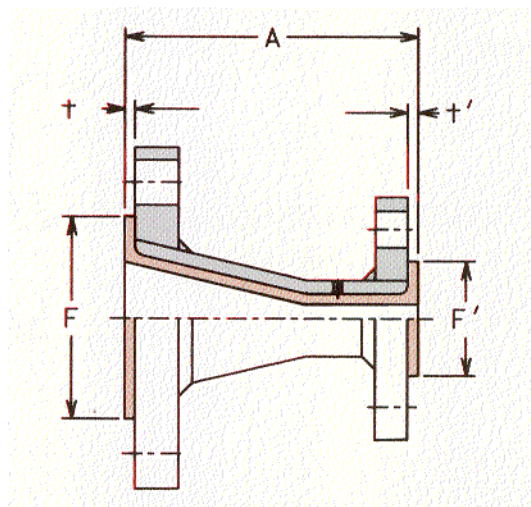
Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: three fixed flanges; three loose flanges or one loose and two fixed flanges or two loose and one fixed flanges are on request.

Lining: pure PTFE in compliance with ASTM D1457, under 4" PFA lined red. tee is on request.

Other nominal sizes are available on request.

PTFE Lined Concentric Reducer



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | F' | A | t | t' | G.W. (kg) |
|-----------------|--------|-----|-----|-----|---|----|-----------|
| Inch | mm | | | | | | |
| 1"×1/2" | 25×15 | 48 | 32 | 100 | 3 | 3 | 1.6 |
| 1"×3/4" | 25×20 | 48 | 40 | 100 | 3 | 3 | 2.0 |
| 1-1/2"×1" | 40×25 | 68 | 48 | 100 | 3 | 3 | 3.0 |
| 2"×1" | 50×25 | 87 | 48 | 127 | 3 | 3 | 3.8 |
| 2"×1-1/2" | 50×40 | 87 | 68 | 127 | 3 | 3 | 4.5 |
| 2-1/2" × 1" | 65×25 | 100 | 48 | 127 | 3 | 3 | 5.4 |
| 2-1/2" × 1-1/2" | 65×40 | 100 | 68 | 127 | 3 | 3 | 6.2 |
| 2-1/2" × 2" | 65×50 | 100 | 87 | 127 | 3 | 3 | 7.0 |
| 3" × 1" | 80×25 | 117 | 48 | 152 | 3 | 3 | 6.2 |
| 3" × 1-1/2" | 80×40 | 117 | 68 | 152 | 3 | 3 | 7.0 |
| 3" × 2" | 80×50 | 117 | 87 | 152 | 3 | 3 | 7.6 |
| 3" × 2-1/2" | 80×65 | 117 | 100 | 152 | 3 | 3 | 9.0 |
| 4" × 1" | 100×25 | 151 | 48 | 152 | 3 | 3 | 8.0 |
| 4" × 1-1/2" | 100×40 | 151 | 68 | 152 | 3 | 3 | 8.8 |

PTFE lined pipe and fittings

| Nominal size | | F | F' | A | t | t' | G.W. (kg) |
|--------------|---------|-----|-----|-----|---|----|-----------|
| Inch | mm | | | | | | |
| 4" x2" | 100x50 | 151 | 87 | 152 | 3 | 3 | 10.0 |
| 4" x3" | 100x80 | 151 | 117 | 152 | 3 | 3 | 11.8 |
| 6" x2" | 150x50 | 203 | 87 | 200 | 4 | 3 | 14.8 |
| 6" x3" | 150x80 | 203 | 117 | 200 | 4 | 3 | 16.8 |
| 6" x4" | 150x100 | 203 | 151 | 200 | 4 | 3 | 18.6 |
| 8" x3" | 200x80 | 256 | 117 | 200 | 4 | 4 | 24.4 |
| 8" x4" | 200x100 | 256 | 151 | 200 | 4 | 3 | 25.5 |
| 8" x6" | 200x150 | 256 | 203 | 200 | 4 | 4 | 30.0 |
| 10" x4" | 250x100 | 311 | 151 | 250 | 5 | 3 | 37.8 |
| 10" x6" | 250x150 | 311 | 203 | 250 | 5 | 4 | 39.4 |
| 10" x8" | 250x200 | 311 | 256 | 250 | 5 | 4 | 44.8 |
| 12" x6" | 300x150 | 365 | 203 | 300 | 5 | 4 | 54.0 |
| 12" x8" | 300x200 | 365 | 256 | 300 | 5 | 4 | 62.2 |
| 12" x10" | 300x250 | 365 | 311 | 300 | 5 | 5 | 71.8 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel reducer: according to SCH 40.

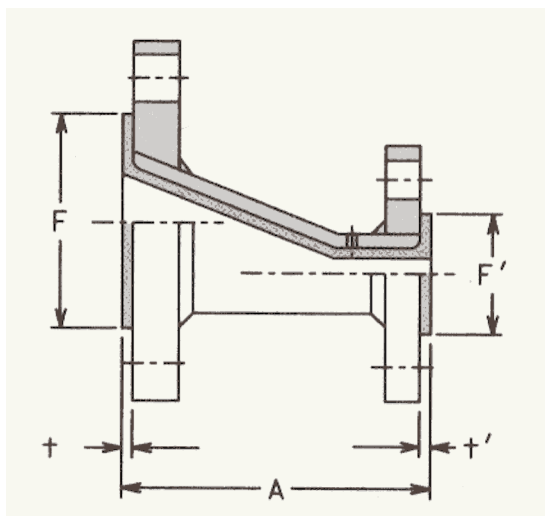
Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: two fixed flanges; two loose flanges or one loose and one fixed flanges are on request.

Lining: pure PTFE in compliance with ASTM D1457, under 4" PFA lined con. reducer is on request.

Other nominal sizes are available on request.

PTFE Lined Eccentric Reducer



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | F' | A | t | t' | G.W. (kg) |
|----------------|--------|-----|-----|-----|---|----|-----------|
| Inch | mm | | | | | | |
| 1-1/2"×1" | 40×25 | 68 | 48 | 100 | 3 | 3 | 3.0 |
| 2"×1" | 50×25 | 87 | 48 | 127 | 3 | 3 | 4.0 |
| 2"×1-1/2" | 50×40 | 87 | 68 | 127 | 3 | 3 | 4.3 |
| 2-1/2" ×1" | 65×25 | 100 | 48 | 127 | 3 | 3 | 5.4 |
| 2-1/2" ×1-1/2" | 65×40 | 100 | 68 | 127 | 3 | 3 | 5.6 |
| 2-1/2" ×2" | 65×50 | 100 | 87 | 127 | 3 | 3 | 6.5 |
| 3" ×1" | 80×25 | 117 | 48 | 152 | 3 | 3 | 6.8 |
| 3" ×1-1/2" | 80×40 | 117 | 68 | 152 | 3 | 3 | 7.2 |
| 3" ×2" | 80×50 | 117 | 87 | 152 | 3 | 3 | 7.8 |
| 3"×2-1/2" | 80×65 | 117 | 100 | 152 | 3 | 3 | 9.0 |
| 4" ×1-1/2" | 100×40 | 151 | 68 | 152 | 3 | 3 | 9.0 |
| 4" ×2" | 100×50 | 151 | 87 | 152 | 3 | 3 | 10.0 |
| 4" ×3" | 100×80 | 151 | 117 | 152 | 3 | 3 | 12.8 |

PTFE lined pipe and fittings

| Nominal size | | F | F' | A | t | t' | G.W. (kg) |
|--------------|---------|-----|-----|-----|---|----|-----------|
| Inch | MM | | | | | | |
| 6" x2" | 150x50 | 203 | 87 | 200 | 4 | 3 | 15.6 |
| 6" x3" | 150x80 | 203 | 117 | 200 | 4 | 3 | 17.0 |
| 6" x4" | 150x100 | 203 | 151 | 200 | 4 | 3 | 18.7 |
| 8" x4" | 200x100 | 256 | 151 | 200 | 4 | 3 | 25.5 |
| 8" x6" | 200x150 | 256 | 203 | 200 | 4 | 4 | 30.0 |
| 10" x4" | 250x100 | 311 | 151 | 250 | 5 | 3 | 42.5 |
| 10" x6" | 250x150 | 311 | 203 | 250 | 5 | 4 | 44.6 |
| 10" x8" | 250x200 | 311 | 256 | 250 | 5 | 4 | 50.0 |
| 12" x6" | 300x150 | 365 | 203 | 300 | 5 | 4 | 55.0 |
| 12" x8" | 300x200 | 365 | 256 | 300 | 5 | 4 | 63.2 |
| 12" x10" | 300x250 | 365 | 311 | 300 | 5 | 5 | 73.0 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel reducer: according to SCH 40.

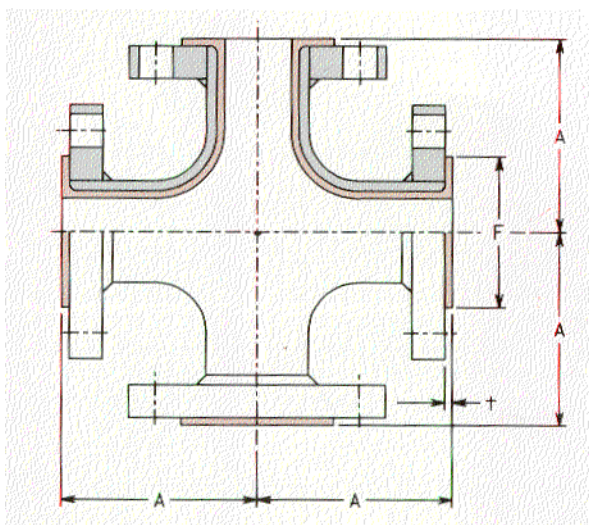
Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: two fixed flanges; two loose flanges or one loose and one fixed flanges are on request.

Lining: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

PTFE Lined Cross



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | A | t | G.W. (kg) |
|--------------|-----|-----|-----|---|-----------|
| Inch | mm | | | | |
| 1" | 25 | 48 | 89 | 3 | 5.0 |
| 1-1/2" | 40 | 68 | 102 | 3 | 8.5 |
| 2" | 50 | 87 | 114 | 3 | 11.8 |
| 3" | 80 | 117 | 140 | 3 | 22.8 |
| 4" | 100 | 151 | 165 | 3 | 31.8 |
| 6" | 150 | 203 | 203 | 4 | 53.0 |
| 8" | 200 | 256 | 228 | 4 | 66.0 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel cross: according to SCH 40.

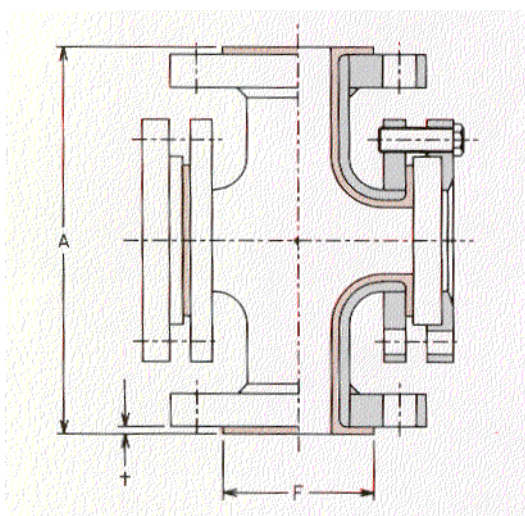
Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

Standard: four fixed flanges; four loose flanges or two loose and two fixed flanges or one fixed and three loose flanges are on request.

Lining: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

PTFE Lined Sight Glass



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | A | t | G.W. (kg) |
|--------------|-----|-----|-----|---|-----------|
| Inch | mm | | | | |
| 1" | 25 | 48 | 178 | 3 | 7.0 |
| 1-1/2" | 40 | 68 | 204 | 3 | 10.2 |
| 2" | 50 | 87 | 228 | 3 | 12.9 |
| 3" | 80 | 117 | 280 | 3 | 22.7 |
| 4" | 100 | 151 | 330 | 3 | 25.6 |
| 6" | 150 | 203 | 406 | 4 | 51.6 |
| 8" | 200 | 256 | 456 | 4 | 64.5 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel sight glass piece: according to SCH 40.

Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

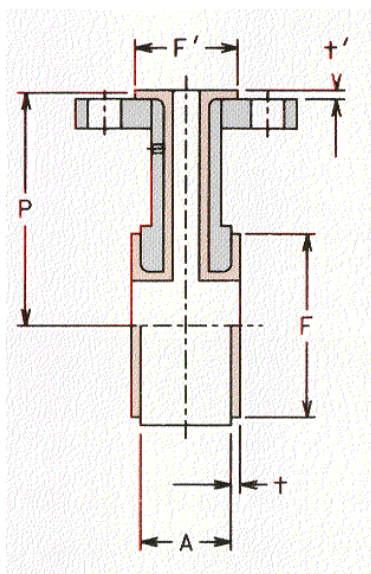
Standard: two fixed flanges; two loose flanges or one loose and one fixed flanges are on request.

Lining: pure PTFE in compliance with ASTM D1457.

Glasses: press glass and FEP film lined.

Other nominal sizes are available on request.

PTFE Lined Instrument Tee



Flange: ANSI 150LBS

unit: mm

| Nominal size | | F | F' | A | P | t | t' | G.W. (kg) |
|--------------|--------|-----|----|----|-----|---|----|-----------|
| Inch | mm | | | | | | | |
| 1"×1" | 25×25 | 48 | 48 | 50 | 90 | 3 | 3 | 2.4 |
| 1-1/2"×1" | 40×25 | 68 | 48 | 50 | 100 | 3 | 3 | 3.0 |
| 2"×1" | 50×25 | 87 | 48 | 50 | 114 | 3 | 3 | 3.2 |
| 2-1/2" ×1" | 65×25 | 100 | 48 | 50 | 127 | 3 | 3 | 4.4 |
| 3" ×1" | 80×25 | 117 | 48 | 50 | 140 | 3 | 3 | 4.8 |
| 4" ×1" | 100×25 | 151 | 48 | 50 | 165 | 3 | 3 | 7.2 |
| 6" ×1" | 150×25 | 203 | 48 | 50 | 200 | 4 | 3 | 9.8 |
| 8" ×1" | 200×25 | 256 | 48 | 50 | 228 | 4 | 3 | 13.2 |
| 10" ×1" | 250×25 | 311 | 48 | 50 | 250 | 5 | 3 | 18.6 |
| 12" ×1" | 300×25 | 365 | 48 | 50 | 305 | 5 | 3 | 26.5 |

Steel frame: ASTM A234 grade WPB, in compliance with ANSI B16.28

Steel instrument tee piece: according to SCH 40.

Flange: ASTM A105, in compliance with ANSI B16.5/Class 150lbs; JIS 10K or DIN is also available on request.

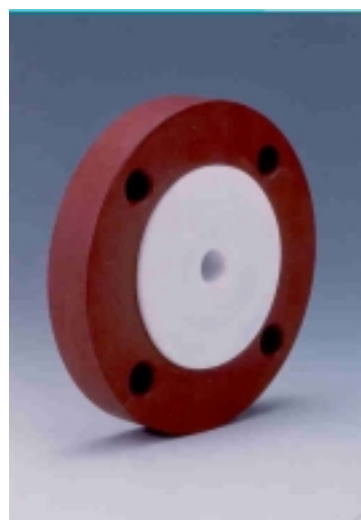
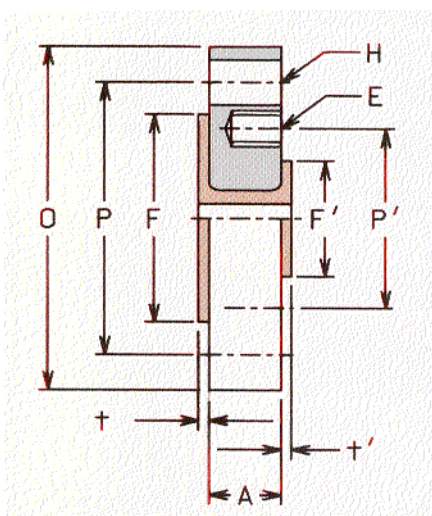
Standard: one fixed flange; loose flange is on request.

Lining: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

PTFE lined pipe and fittings

PTFE Lined Reducing Flange



Flange: ANSI 150LBS

unit: mm

| Size (inch) | A | F | F' | t | T' | H holes×Φ | P | P' | O (OD) | E holes×Φ | G.W. (kg) |
|---------------|----|-----|-----|---|----|-------------|-------|-------|--------|-------------|-----------|
| 1"×1/2" | 32 | 48 | 32 | 3 | 3 | 4-TAP× 1/2" | 79.4 | 60.3 | 108 | 4-TAP× 1/2" | 2.2 |
| 1"×3/4" | 32 | 48 | 40 | 3 | 3 | 4-TAP× 1/2" | 79.4 | 69.0 | 108 | 4-TAP× 1/2" | 2.2 |
| 1-1/2"×3/4" | 32 | 68 | 40 | 3 | 3 | 4-TAP× 1/2" | 98.4 | 69.0 | 127 | 4-TAP× 1/2" | 3.1 |
| 1-1/2"×1" | 32 | 68 | 48 | 3 | 3 | 4-TAP× 1/2" | 98.4 | 79.4 | 127 | 4-TAP× 1/2" | 3.2 |
| 2"×1" | 32 | 87 | 48 | 3 | 3 | 4-TAP× 5/8" | 120.6 | 79.4 | 152 | 4-TAP× 1/2" | 4.4 |
| 2"×1-1/2" | 32 | 87 | 68 | 3 | 3 | 4-TAP× 5/8" | 120.6 | 98.4 | 152 | 4-TAP× 1/2" | 4.2 |
| 2-1/2"×1" | 32 | 100 | 48 | 3 | 3 | 4×19Φ | 139.7 | 79.4 | 178 | 4-TAP× 1/2" | 6.1 |
| 2-1/2"×1-1/2" | 32 | 100 | 68 | 3 | 3 | 4-TAP× 5/8" | 139.7 | 98.4 | 178 | 4-TAP× 1/2" | 6.0 |
| 2-1/2"×2" | 32 | 100 | 87 | 3 | 3 | 4-TAP× 5/8" | 139.7 | 120.6 | 178 | 4-TAP× 5/8" | 5.6 |
| 3"×1" | 32 | 117 | 48 | 3 | 3 | 4×19Φ | 152.4 | 79.4 | 190 | 4-TAP× 1/2" | 7.0 |
| 3"×1-1/2" | 32 | 117 | 68 | 3 | 3 | 4×19Φ | 152.4 | 98.4 | 190 | 4-TAP× 1/2" | 7.0 |
| 3"×2" | 32 | 117 | 87 | 3 | 3 | 4-TAP× 5/8" | 152.4 | 120.6 | 190 | 4-TAP× 5/8" | 6.8 |
| 3"×2-1/2" | 32 | 117 | 100 | 3 | 3 | 4-TAP× 5/8" | 152.4 | 139.7 | 190 | 4-TAP× 5/8" | 6.5 |
| 4"×1" | 32 | 117 | 48 | 3 | 3 | 8×19Φ | 190.5 | 79.4 | 229 | 4-TAP× 1/2" | 12.5 |
| 4"×1-1/2" | 32 | 151 | 68 | 3 | 3 | 8×19Φ | 190.5 | 98.4 | 229 | 4-TAP× 1/2" | 12.2 |
| 4"×2" | 32 | 151 | 87 | 3 | 3 | 8×19Φ | 190.5 | 120.6 | 229 | 4-TAP× 5/8" | 10.5 |
| 4"×2-1/2" | 32 | 151 | 100 | 3 | 3 | 8-TAP× 5/8" | 190.5 | 139.7 | 229 | 4-TAP× 5/8" | 10.0 |
| 4"×3" | 32 | 151 | 117 | 3 | 3 | 8-TAP× 5/8" | 190.5 | 152.4 | 229 | 4-TAP× 5/8" | 9.8 |
| 6"×1" | 30 | 151 | 48 | 4 | 3 | 8×23Φ | 241.3 | 79.4 | 279 | 4-TAP× 1/2" | 14.2 |
| 6"×1-1/2" | 30 | 203 | 68 | 4 | 3 | 8×23Φ | 241.3 | 98.4 | 279 | 4-TAP× 1/2" | 13.8 |
| 6"×2" | 30 | 203 | 87 | 4 | 3 | 8×23Φ | 241.3 | 120.6 | 279 | 4-TAP× 5/8" | 13.5 |
| 6"×3" | 30 | 203 | 117 | 4 | 3 | 8-TAP× 3/4" | 241.3 | 152.4 | 279 | 4-TAP× 5/8" | 13.2 |
| 6"×4" | 30 | 203 | 151 | 4 | 3 | 8×23Φ | 241.3 | 190.5 | 279 | 4-TAP× 5/8" | 12.6 |
| 8"×1" | 30 | 256 | 48 | 4 | 3 | 8×23Φ | 298.4 | 79.4 | 343 | 4-TAP× 1/2" | 22.5 |

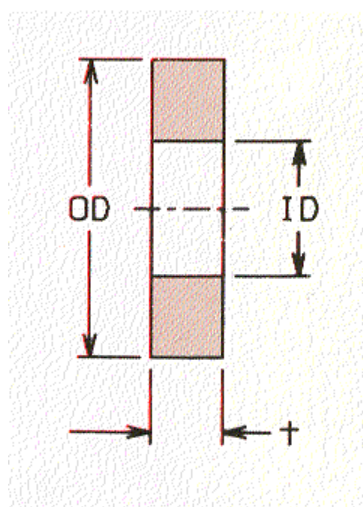
| Size (inch) | A | F | F' | t | t' | H holes×Φ | P | P' | O (OD) | E holes×Φ | G.W. (kg) |
|----------------|----|-----|-----|---|----|--------------|-------|-------|-----------|--------------|--------------|
| 8"×1-1/2" | 30 | 256 | 68 | 4 | 3 | 8×23Φ | 298.4 | 98.4 | 343 | 4-TAP× 1/2" | 22.0 |
| 8"×2" | 30 | 256 | 87 | 4 | 3 | 8×23Φ | 298.4 | 120.6 | 343 | 4-TAP× 5/8" | 21.6 |
| 8"×3" | 30 | 256 | 117 | 4 | 3 | 8×23Φ | 298.4 | 152.4 | 343 | 4-TAP× 5/8" | 21.0 |
| 8"×4" | 30 | 256 | 151 | 4 | 3 | 8×23Φ | 298.4 | 190.5 | 343 | 8-TAP× 5/8" | 20.0 |
| 8"×6" | 30 | 256 | 203 | 4 | 4 | 8-TAP ×3/4" | 298.4 | 241.3 | 343 | 8-TAP× 3/4" | 18.8 |
| 10"×1" | 30 | 311 | 48 | 5 | 3 | 12×25Φ | 361.9 | 79.4 | 406 | 4-TAP× 1/2" | 34.7 |
| 10"×1-1/2" | 30 | 311 | 68 | 5 | 3 | 12×25Φ | 361.9 | 98.4 | 406 | 4-TAP× 1/2" | 34.5 |
| 10"×2" | 30 | 311 | 87 | 5 | 3 | 12×25Φ | 361.9 | 120.6 | 406 | 4-TAP× 5/8" | 34.2 |
| 10"×3" | 30 | 311 | 117 | 5 | 3 | 12×25Φ | 361.9 | 152.4 | 406 | 4-TAP× 5/8" | 33.5 |
| 10"×4" | 30 | 311 | 151 | 5 | 3 | 12×25Φ | 361.9 | 190.5 | 406 | 8-TAP× 5/8" | 32.5 |
| 10"×6" | 30 | 311 | 203 | 5 | 4 | 12×25Φ | 361.9 | 241.3 | 406 | 8-TAP× 3/4" | 30.0 |
| 10"×8" | 30 | 311 | 256 | 5 | 4 | 12-TAP×7/8" | 361.9 | 298.4 | 406 | 8-TAP× 3/4" | 26.0 |
| 12"×2" | 30 | 365 | 87 | 5 | 3 | 12×25Φ | 431.8 | 120.6 | 483 | 4-TAP× 5/8" | 48.6 |
| 12"×4" | 30 | 365 | 151 | 5 | 3 | 12×25Φ | 431.8 | 190.5 | 483 | 8-TAP× 5/8" | 47.4 |
| 12"×6" | 30 | 365 | 203 | 5 | 4 | 12×25Φ | 431.8 | 241.3 | 483 | 8-TAP× 3/4" | 44.8 |
| 12"×8" | 30 | 365 | 256 | 5 | 4 | 12×25Φ | 431.8 | 298.4 | 483 | 8-TAP× 3/4" | 40.8 |
| 12"×10" | 30 | 365 | 311 | 5 | 5 | 12TAP×7/8" | 431.8 | 361.9 | 483 | 12TAP× 7/8" | 36.2 |

Lining: pure PTFE in compliance with ASTM D1457

Other nominal sizes are available on request.

Solid Spacer

Unit: mm



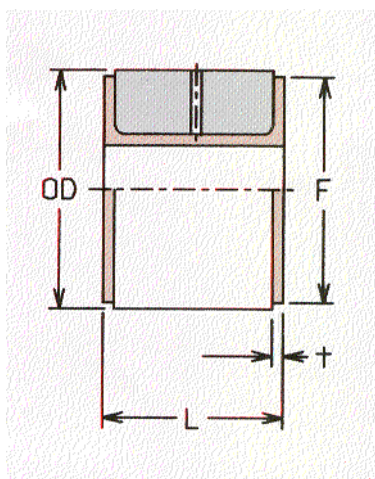
| Nominal size | | OD | ID | t |
|--------------|-----|--------|--------|------|
| Inch | mm | | | |
| 1" | 25 | 66 | 21.5 | 3~50 |
| 1-1/2" | 40 | 85 | 35.5 | 3~50 |
| 2" | 50 | 104 | 47.0 | 3~50 |
| 3" | 80 | 136 | 72.5 | 3~50 |
| 4" | 100 | 174 | 96.5 | 3~50 |
| 6" | 150 | 221.5 | 145.0 | 3~50 |
| 8" | 200 | 278.5 | 193.0 | 3~50 |
| 10" | 250 | 339 | 243.0 | 3~50 |
| 12" | 300 | 409 | 290.0 | 3~50 |
| Tolerance | | +0, -3 | +0, -3 | |

Material: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

Armored Spacer

Unit: mm



| Nominal size | | OD | F | t | L (max) |
|--------------|-----|-------|-----|-----|------------|
| Inch | mm | | | | |
| 1" | 25 | 60.0 | 48 | 3 | 30~75 |
| 1-1/2" | 40 | 76.3 | 68 | 3 | 30~75 |
| 2" | 50 | 97.9 | 87 | 3 | 30~75 |
| 3" | 80 | 127.0 | 117 | 3 | 30~75 |
| 4" | 100 | 168.9 | 151 | 3.5 | 30~75 |
| 6" | 150 | 214.3 | 203 | 6.5 | 30~75 |
| 8" | 200 | 273.9 | 256 | 6.5 | 30~75 |
| 10" | 250 | 331.9 | 311 | 7.5 | 30~75 |
| 12" | 300 | 404.9 | 365 | 10 | 30~75 |

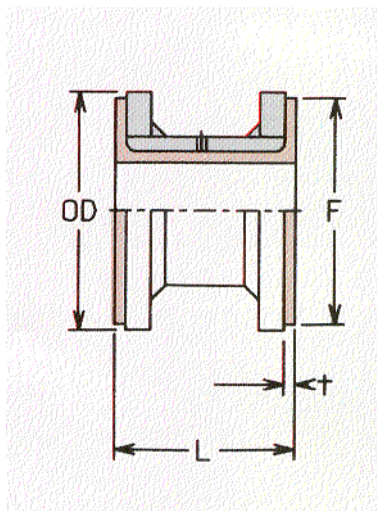
Steel frame: ASTM A234 grade WPB, In compliance with ANSI B16.28

Lining: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

Distance Spacer

Unit: mm



| Nominal size | | OD | F | t | L (max) |
|--------------|-----|-------|-----|-----|---------|
| Inch | mm | | | | |
| 1" | 25 | 60.0 | 48 | 3.0 | 75~300 |
| 1-1/2" | 40 | 76.3 | 68 | 3.0 | 75~300 |
| 2" | 50 | 97.9 | 87 | 3.0 | 75~300 |
| 3" | 80 | 127.0 | 117 | 3.0 | 75~300 |
| 4" | 100 | 168.9 | 151 | 3.5 | 75~300 |
| 6" | 150 | 214.3 | 203 | 4.5 | 75~300 |
| 8" | 200 | 273.9 | 256 | 4.5 | 75~300 |
| 10" | 250 | 331.9 | 311 | 5.0 | 75~300 |
| 12" | 300 | 404.9 | 365 | 5.0 | 75~300 |

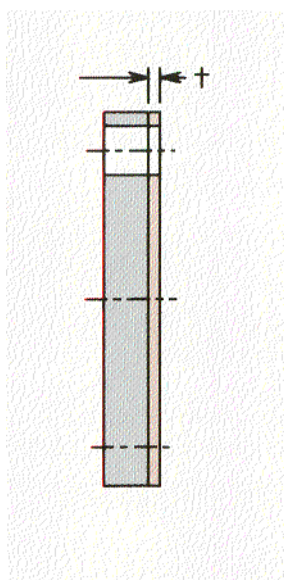
Steel frame: ASTM A234 grade WPB, in compliance with A NSI B16.28

Lining: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

PTFE Lined Blind Flange

Unit: mm



| Nominal size | | T | G.W.(kg) |
|--------------|-----|-----|----------|
| Inch | mm | | |
| 1" | 25 | 3.0 | 1.0 |
| 1-1/2" | 40 | 3.0 | 1.9 |
| 2" | 50 | 3.0 | 2.5 |
| 2-1/2" | 65 | 3.0 | 3.4 |
| 3" | 80 | 3.0 | 4.3 |
| 4" | 100 | 3.0 | 8.0 |
| 6" | 150 | 3.0 | 12.5 |
| 8" | 200 | 3.0 | 21.5 |
| 10" | 250 | 3.0 | 33.0 |
| 12" | 300 | 3.0 | 52.0 |

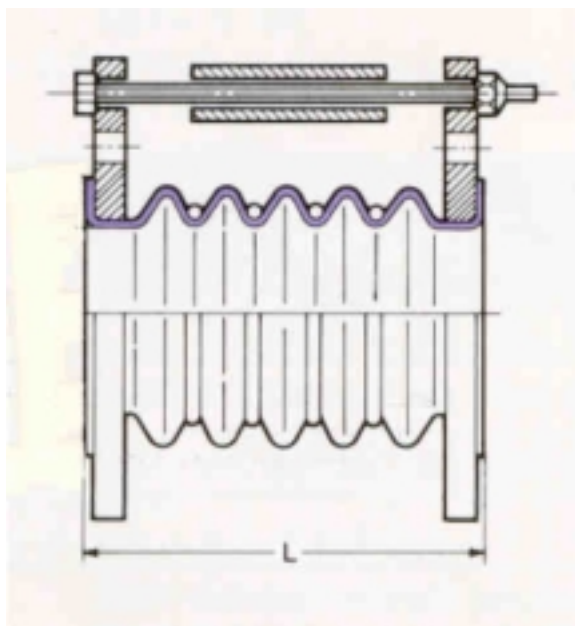
Flange: ASTM A105, in compliance with ANSI

B16.5/Class150lbs; JIS 10k or DIN is also available on request

Material: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

PTFE Bellows



Flange: ANSI 150LBS

unit: mm

| Nominal size | | 2 con. | 3 con. | 5 con. |
|--------------|-----|--------|--------|--------|
| Inch | mm | | | |
| 1" | 25 | 50 | 61 | 83 |
| 1-1/2" | 40 | 61 | 76 | 105 |
| 2" | 50 | 59 | 78 | 115 |
| 2-1/2" | 65 | 69 | 86 | 120 |
| 3" | 80 | 73 | 95 | 137 |
| 4" | 100 | 74 | 96 | 138 |
| 6" | 150 | 87 | 112 | 160 |
| 8" | 200 | 97 | 123 | 175 |
| 10" | 250 | 99 | 128 | 186 |
| 12" | 300 | 102 | 133 | 194 |
| 14" | 350 | 103 | 134 | 195 |

Flange: two pieces of carbon steel flanges with epoxy one coated; stainless steel is available on request. JIS 10k or DIN is available either.

Adjustment screw: three piece screws with zinc plated.

Support rings volume=con. -1, carbon steel with chrome plated.

Lining: pure PTFE in compliance with ASTM D1457.

Other nominal sizes are available on request.

Pipe Dimensions

| Diameter | | OD | Nominal wall thickness | | | |
|----------|-----|-------|------------------------|--------|--------|--------|
| Inch | mm | | SCH 20 | SCH 30 | SCH 40 | SCH 80 |
| 1/2" | 15 | 21.3 | | | 2.77 | 3.73 |
| 3/4" | 20 | 26.7 | | | 2.87 | 3.91 |
| 1" | 25 | 33.4 | | | 3.38 | 4.55 |
| 1-1/2" | 40 | 48.3 | | | 3.68 | 5.08 |
| 2" | 50 | 60.3 | | | 3.91 | 5.54 |
| 2-1/2" | 65 | 73.0 | | | 5.16 | 7.01 |
| 3" | 80 | 88.9 | | | 5.49 | 7.62 |
| 4" | 100 | 114.3 | | | 6.02 | 8.56 |
| 6" | 150 | 168.3 | | | 7.11 | 10.97 |
| 8" | 200 | 219.1 | 6.35 | 7.04 | 8.18 | 12.70 |
| 10" | 250 | 273.0 | 6.35 | 7.80 | 9.27 | 15.09 |
| 12" | 300 | 323.8 | 6.35 | 8.38 | 10.31 | 17.48 |

ANSI Class 150lbs flange dimensions (mm)

| Nominal Size (B) | Flange Diameter | T | Diameter Bolt Circle | Number Bolt Holes | Diameter Bolt Holes |
|------------------|-----------------|------|----------------------|-------------------|---------------------|
| 1/2" | 89 | 11.5 | 60.3 | 4 | 16 |
| 3/4" | 98 | 13.0 | 69.8 | 4 | 16 |
| 1" | 108 | 14.5 | 79.4 | 4 | 16 |
| 1-1/2" | 127 | 17.5 | 98.4 | 4 | 16 |
| 2" | 152 | 19.5 | 120.6 | 4 | 20 |
| 2-1/2" | 178 | 22.5 | 139.7 | 4 | 20 |
| 3" | 191 | 24.0 | 152.4 | 4 | 20 |
| 4" | 229 | 24.0 | 190.5 | 8 | 20 |
| 6" | 279 | 25.5 | 241.3 | 8 | 23 |
| 8" | 343 | 29.0 | 298.4 | 8 | 23 |
| 10" | 406 | 30.5 | 361.9 | 12 | 26 |
| 12" | 483 | 32.0 | 431.8 | 12 | 26 |

JIS Class 10K flange dimensions (mm)

| Nominal Size (A) | Flange Diameter | T | Diameter Bolt Circle | Number Bolt Holes | Diameter Bolt Holes |
|------------------|-----------------|----|----------------------|-------------------|---------------------|
| 15 | 95 | 12 | 70 | 4 | 15 |
| 20 | 100 | 14 | 75 | 4 | 15 |
| 25 | 125 | 14 | 90 | 4 | 19 |
| 40 | 140 | 16 | 105 | 4 | 19 |
| 50 | 155 | 16 | 120 | 4 | 19 |
| 65 | 175 | 18 | 140 | 4 | 19 |
| 80 | 185 | 18 | 150 | 8 | 19 |
| 100 | 210 | 18 | 175 | 8 | 19 |
| 150 | 280 | 22 | 240 | 8 | 23 |
| 200 | 330 | 22 | 290 | 12 | 23 |
| 250 | 400 | 24 | 355 | 12 | 25 |
| 300 | 445 | 24 | 400 | 16 | 25 |

DIN PN16 flange dimensions (mm)

| Nominal Size(DN) | Flange Diameter | T | Diameter Bolt Circle | Number Bolt Holes | Diameter Bolt Holes |
|------------------|-----------------|----|----------------------|-------------------|---------------------|
| 15 | 95 | 14 | 65 | 4 | 14 |
| 20 | 105 | 16 | 75 | 4 | 14 |
| 25 | 115 | 16 | 85 | 4 | 14 |
| 40 | 150 | 16 | 110 | 4 | 18 |
| 50 | 165 | 18 | 125 | 4 | 18 |
| 65 | 185 | 18 | 145 | 4 | 18 |
| 80 | 200 | 20 | 160 | 8 | 18 |
| 100 | 220 | 20 | 180 | 8 | 18 |
| 150 | 285 | 22 | 240 | 8 | 23 |
| 200 | 340 | 24 | 295 | 12 | 23 |
| 250 | 405 | 26 | 355 | 12 | 27 |
| 300 | 460 | 28 | 410 | 12 | 27 |

INSTRUCTIONS FOR ASSEMBLING PIPES AND FITTINGS

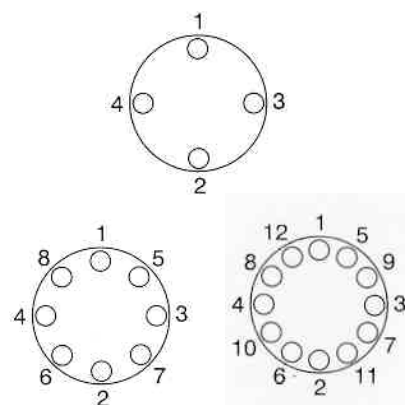
1. Flange covers should not be removed until flanges are ready to be bolted into position or sealing faces may become damages or distorted. If covers are removed for inspection, they should be replaced immediately.
2. Gaskets are not required with PTFE lined piping components except where they are connected to a flange face of another material such as metal, glass, ceramic, reinforced plastic, etc.
3. Bolts should be tightened using proper bolt torque, the torque values in the tables as below.
4. Threads must be clean and well lubricated. And washers should be used to ensure correct torque. Bolt should be tightened alternately and evenly, following the sequence shown in the charts.
5. If a flange leak occurs and the bolts of the leaking side have been properly tightened, they should not be tightened further or permanent damage to the sealing face may result. Instead, the bolts on the opposite side should be loosened a half turn at a time and then the bolts on the leaking side should be tightened by the same amount. If the leak persists, the bolts should be removed and the sealing faces should be examined for scratches or dents across and entire face that could produce a leak path. Any scratches or dents that do not exceed 20% of the liner thickness can be eliminated by hand polishing with a fine abrasive cloth or paper.
6. If leakage occurs after the system has been cycled in an elevated temperature, it should be cool down to ambient temperature, to have a further inspection and maintenance.
7. No welding, brazing, soldering or flame cutting which can permanently damage the PTFE liner should be done close to the metal housings unless adequate precautions are taken to prevent exposure to excessive heat.
8. Safety vent holes should not be plugged with paint, cement, etc. The vent holes are essential to release gases that may be generated at elevated temperatures and trapped between the liner and the housing. If not vented these gases may collapse the liner. Vent holes also serve to warn of any accidental damage to the liner before leakage reaches dangerous proportions.

Table: Tightened Torque

Unit: kgf-m

| ANSI 150LB | | | JIS 10K | | |
|------------|------|------|---------|------|------|
| NPS | MIN. | MAX. | NPS | MIN. | MAX. |
| 1/2" | 0.7 | 1.0 | 15mm | 0.5 | 0.7 |
| 3/4" | 0.9 | 1.3 | 20mm | 0.7 | 1.0 |
| 1" | 1.2 | 1.8 | 25mm | 1.2 | 1.8 |
| 1-1/2" | 1.9 | 2.8 | 40mm | 2.1 | 3.1 |
| 2" | 3.5 | 5.3 | 50mm | 3.2 | 4.8 |
| 3" | 5.6 | 8.3 | 80mm | 2.8 | 4.2 |
| 4" | 3.9 | 5.9 | 100mm | 4.4 | 6.5 |
| 6" | 7.9 | 11.8 | 150mm | 9.2 | 13.7 |
| 8" | 10.1 | 15.2 | 200mm | 8.4 | 12.6 |
| 10" | 10.0 | 15.2 | 250mm | 12.1 | 18.2 |
| 12" | 10.9 | 16.4 | 300mm | 11.9 | 17.9 |

Chart:



PTFE lined pipe and fittings