

## TECHNICAL SPECIFICATION FOR PTFE LINED PIPES & FITTINGS

### 1. CHEMICAL RESISTANCE :

PTFE is chemically inert to all chemical and solvents with the exception of molten alkali metals and strong Fluorine donors. We use fine virgin PTFE powder (not any recycled material) to produce PTFE liners with the ultimate chemical and physical properties. PTFE lined pipe work can be used with aggressive media such as HCl, H<sub>2</sub>SO<sub>4</sub> (Various Conc.), HNO<sub>3</sub>, Hot NaOH Solutions, all chlorides-Organic & Inorganic all phenols, all sulphates etc.

### 2. TEMPERATURE RESISTANCE :

PTFE has good flexibility and ductility in the temperature range of (-)50° to 235° C. It should be noted that PTFE can be used at higher temperature (above 200° C) and at lower temperature (Below (-) 10° C) under certain conditions.

### 3. OPERATING PRESSURE :

PTFE lined pipework can be used up to 20 bar/300 psi.g.

Full vacuum resistance depending upon the process conditions. Details to be provided by client for specific application.

### 4. RESISTANT TO LIGHT AND ATMOSPHERIC CONDITIONS :

PTFE may be used without any problem in the open air as there are no mechanical and electrical characteristics even then subject to extreme climatic conditions.

### 5. ELECTRICAL PROPERTIES :

PTFE has good electrical insulation with a very low dielectric constant.

### 6. MATERIAL SPECIFICATIONS :

- Pipe : ASTM-A 106 Gr.B, Seamless Sch. 40 All Pipe Spools have lap joint flange at one end and fix flange at other end. Lined pipes are available up to 3 mtrs. length max. (higher length available upon request.
- Flange : Flanges made from boiler quality plate material confirming to IS 2062 ASA 150 class and dimension as per ANSI B 16.5 depending upon material availability.

- Coller : Coller made from boiler quality plate/plate material confirming to IS 2062 depending upon the material availability

- Fittings : Formed and fabricated from seamless C.S. Pipe/So-iron lined with PTFE/FEP/PFA.

- Lining : As per ASTM F 1545 / 95

\*Minimum flare thickness : >80 of the actual extruded liner thickness

### 7. INSPECTION & TESTING :

Dimensional Check : As per product catalogue.

Hydro Test : All 150 class pipes & fittings shall be tested at 25 bar after lining and 46.5 bar for 300 class pipes and fittings.

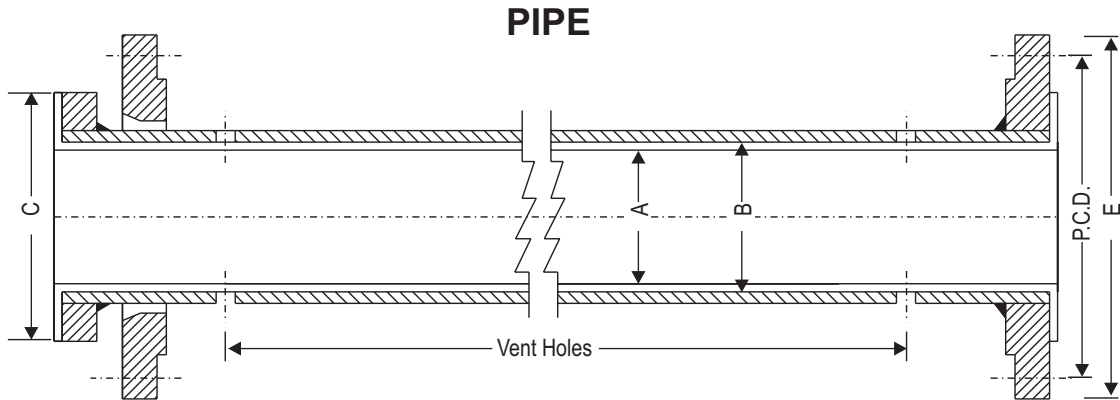
Electrostatic Test : A test voltage of 10KV to 25 KV depending upon liner thickness.

### 8. STORAGE :

- \* Pipe Spools and Fittings should not be stored in open area.
- \* Keep away from all sources of corrosive vapour / flame / heat during storage.
- \* Keep flare cover till pipes/fittings are installed to avoid damage and deformation of the flare faces. Flange covers should be put back immediately, on any sections removed for inspection or for maintenance from the system.

### 9. INSTALLATION :

- \* Gaskets are not required between piping components except, where they are connected to a flange face of other materials.
- \* Metal part of Pipe/Fittings should not be used for electrical earthing.
- \* Avoid rough handling, do not drop from a height.
- \* Do not bend, weld, solder, braze on Lined Pipes/Fittings.
- \* Use expansion joints for thermal expansion of long lengths of lined piping.

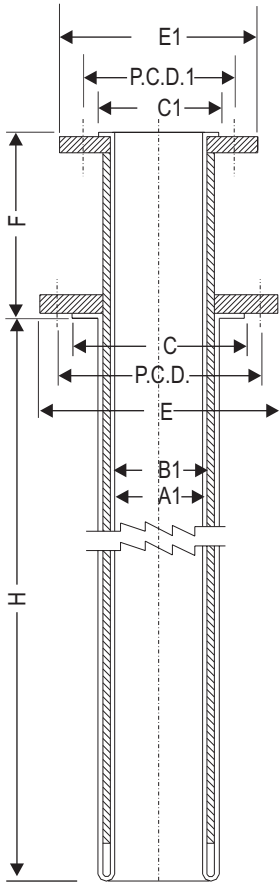


### SPECIFICATION FOR LINED PIPES

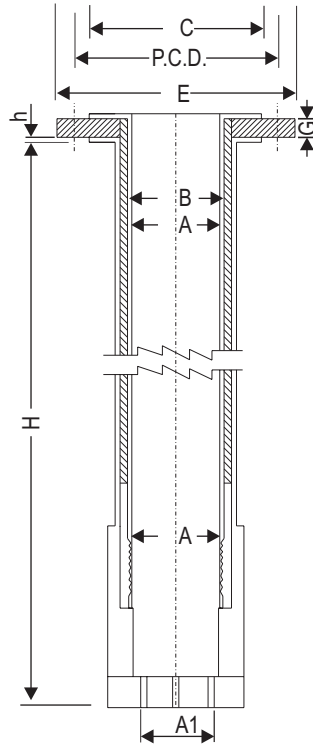
NB	ØA (± 1)	B	ØC	PCD	ØE	No. of Holes	Hole. Dia
15	10.8	15.8	34.9	60.3	88.9	4	15.9
20	16.0	21.0	42.7	69.8	98.4	4	15.9
25	21.6	26.6	50.8	79.4	108.0	4	15.9
32	28.1	35.1	63.5	88.9	117.5	4	15.9
40	33.9	40.9	73.0	98.4	127.0	4	15.9
50	45.5	52.5	92.1	120.7	152.4	4	19.0
65	55.7	62.7	104.8	139.7	177.8	4	19.0
80	70.9	77.9	127.0	152.4	190.5	4	19.0
100	95.3	102.3	157.2	190.5	228.6	8	19.0
125	119.2	128.2	185.7	215.9	254.0	8	22.2
150	145.1	154.1	215.9	241.3	279.4	8	22.2
200	196.1	205.1	269.9	298.5	342.9	8	22.2
250	246.4	257.4	323.9	362.0	406.4	12	25.4
300	296.0	307.0	381.0	431.8	482.6	12	25.4

1. All dimensions are in millimeters.
2. Fixed/loose/split flanges on one /both sides can be supplied on request.
3. Other specifications/dimensions/vacuum service available on request.
4. Lengths: 3 meter lengths  
 longer Lengths available on request  
 Tolerance upto 1 meter length will be + 0.0mm/ -3.5mm and  
 beyond 1 meter will be +0.0mm/ -5.0mm.

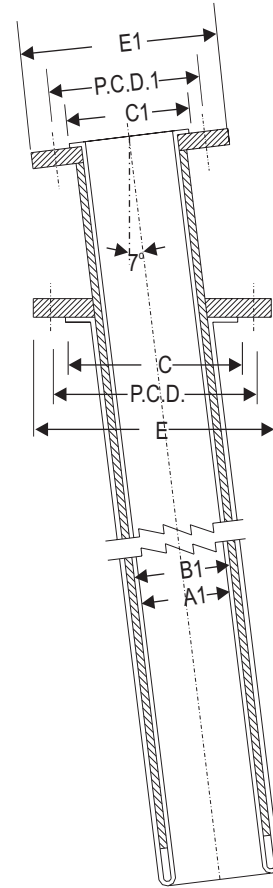
### DIP PIPE / SPARGER



**TYPE A**



**TYPE B**



**TYPE C**

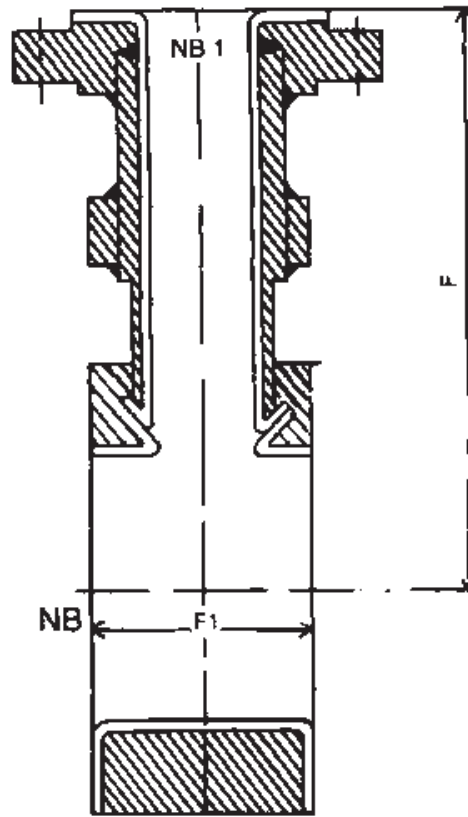
### SPECIFICATION FOR LINED DIP PIPE / SPARGER

1. All dimensions are in millimeters.
2. Tolerances as follows:  
 $H = +0.0 / -7.0$  mm  
 $F = 0.0 / -4.0$  mm.
3. Product Features: Continuous lining, No welded joints, Straight or curved shape 25 mm to 100 mm Nominal Bore, Lengths (H) upto 3000 mm, longer lengths on request.
4. For quotation purposes please specify Length required; Flange details; Tip requirement.
5. Special ends available for spargers and other tailor made requirements

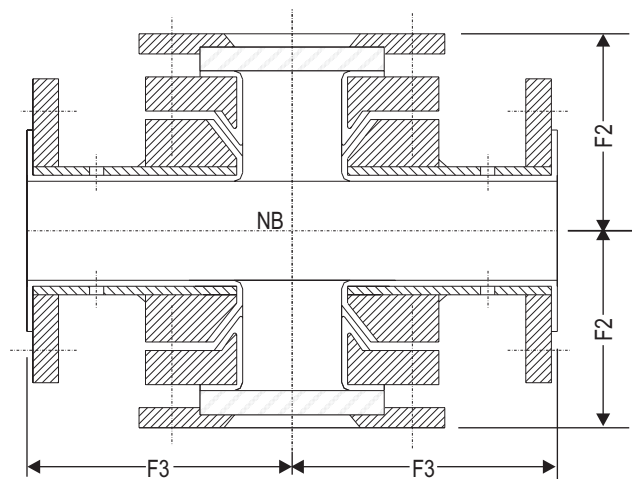
**SPECIFICATIONS FOR LINED  
INSTRUMENT TEE AND SIGHT GLASS**

		TEE		SIGHT GLASS	
NB	NB1	F	F1	F2	F3
25	15	120	50	65	89
	25	120	50		
32	15	130	50	70	95
	25	130	50		
40	15	135	50	75	102
	25	135	50		
	40	135	75		
50	15	150	50	85	114
	25	150	50		
	40	150	75		
65	15	165	50	100	127
	25	165	50		
	40	165	75		
80	15	180	50	110	140
	25	180	50		
	40	180	75		
100	15	200	50	130	165
	25	200	50		
	40	200	75		
125	15	234	50	145	190
	25	235	50		
	40	250	75		
150	15	250	50	70	203
	25	250	50		
	40	250	75		
200	15	275	50	200	229
	25	275	50		
	40	275	75		
250	15	325	50	250	279
	25	325	50		
	40	325	75		
300	15	355	50		
	25	355	50		
	40	355	75		

**INSTRUMENT TEE**



**SIGHT GLASS**

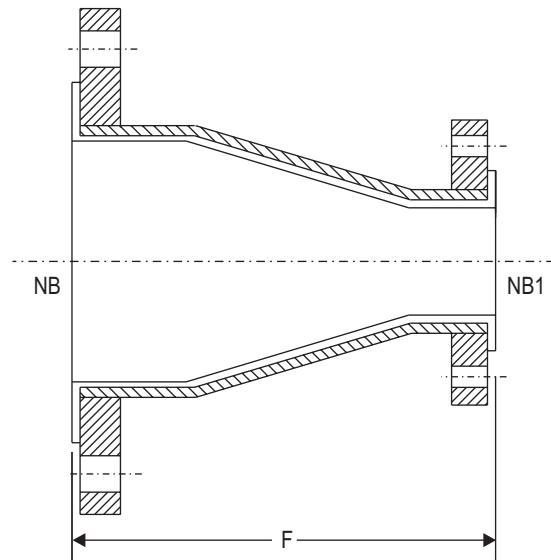


1. All dimensions are in millimeters.
2. Tolerances as follows:  
 $F_1 = +0.0/-2.0$  mm.  
 $F_2 = \pm 3.0$  mm.  
 $F_3 = +0.0/-4.0$  mm.
3. Toughened borosilicate glass will be used for sight glass.
4. Instrument tee with  $NB_1 = 15$  mm will have reducer type branch.

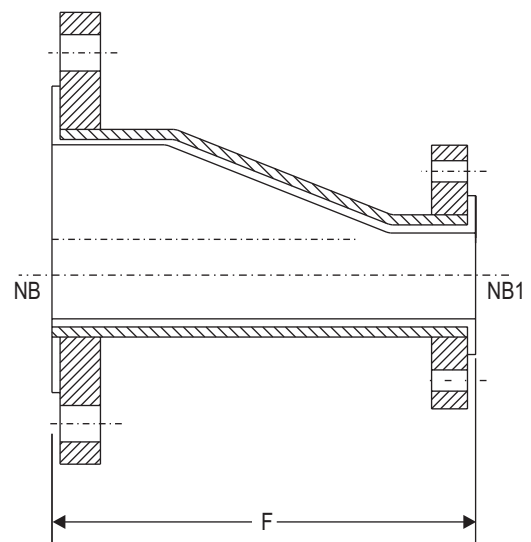
**SPECIFICATION FOR LINED REDUCERS**

NB	NB1	F	NB	NB1	F
20	15	114	125	100	203
25	20	114	125	80	203
25	15	114	125	50	203
32	25	114	150	125	229
32	20	114	150	100	229
40	32	114	150	80	229
40	25	114	150	50	229
50	40	127	150	40	229
50	32	127	150	25	229
50	25	127	200	150	279
65	50	127	200	125	279
65	40	127	200	100	279
80	65	152	200	80	279
80	50	152	250	200	305
80	40	152	250	150	305
80	25	152	250	100	305
100	50	178	300	200	356
100	40	178	300	150	356
100	25	178	350	300	406

**REDUCERS**



CONCENTRIC



ECCENTRIC

1. All dimensions are in millimeters.
2. Tolerance as follows :  
F = +0.0/-4.0 mm.
3. Intermediate combinations are available on request.

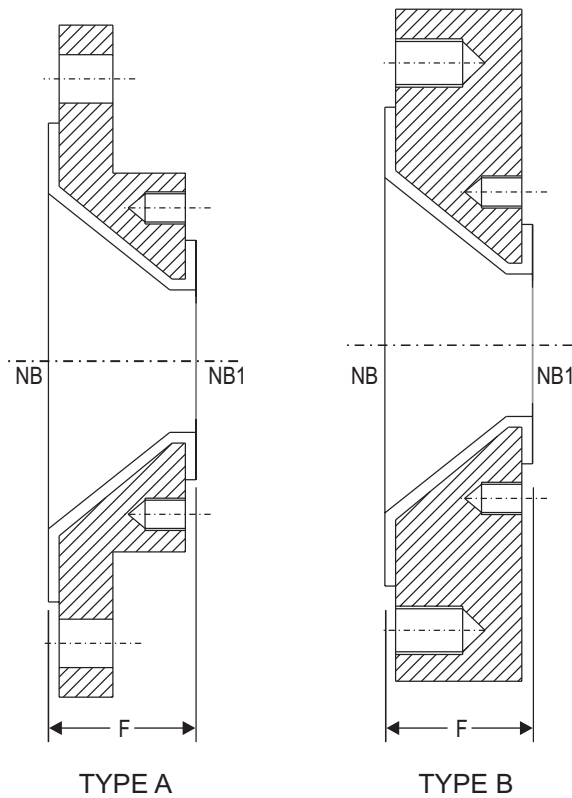
**SPECIFICATION FOR LINED PIPES**

NB	NB1	F
20	15	35
25	20	35
25	15	35
32	25	35
32	20	35
40	32	35
40	20	35
50	40	35
50	32	35
50	25	35
50	20	35
65	50	35
65	40	35
65	20	35

NB	NB1	F
80	65	45
80	50	45
80	40	45
80	25	45
100	80	45
100	65	45
100	50	45
100	40	45
100	25	45
125	100	45
125	80	45
125	50	45
150	125	54
150	100	54

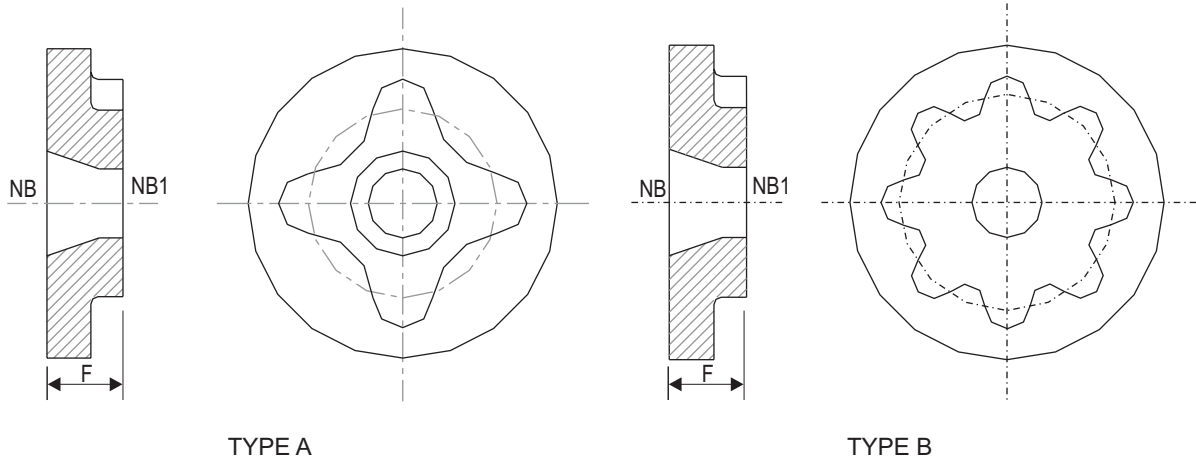
NB	NB1	F
150	80	54
200	150	54
200	125	54
200	100	54
200	80	54
200	50	54
250	200	54
250	150	54
250	100	54
250	80	54
300	250	54
300	200	54
300	100	54
350	300	60
350	200	60
350	100	60

**REDUCING FLANGES**



1. All dimensions are in millimeters.
2. Tolerance as follows :  $F = +0.0/-1.0$  mm.
3. Intermediate combinations are available on request.

### REDUCING FLANGES



### SPECIFICATIONS FOR FEP / PFA LINED REDUCING FLANGES

NB	NB1	F
20	15	35
25	20	35
25	15	35
32	25	35
32	20	35
40	32	35
40	20	35
50	40	35
50	32	35
50	25	35
50	20	35
65	50	35
65	40	35
65	20	35

NB	NB1	F
80	65	45
80	50	45
80	40	45
80	25	45
100	80	45
100	65	45
100	50	45
100	40	45
100	25	45
125	100	45
125	80	45
125	50	45
150	125	54
150	100	54

NB	NB1	F
150	80	54
200	150	54
200	125	54
200	100	54
200	80	54
200	50	54
250	200	54
250	150	54
250	100	54
250	80	54
300	250	54
300	200	54
300	100	54
350	300	60
350	200	60
350	100	60

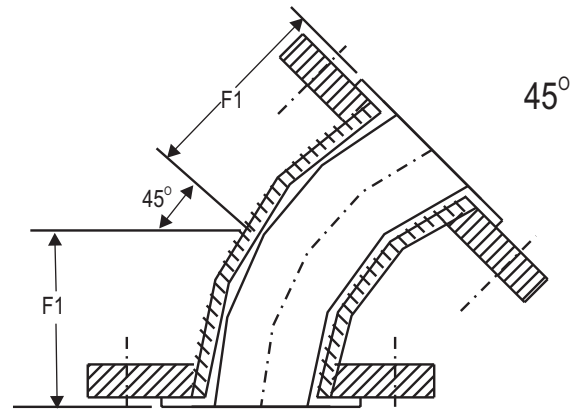
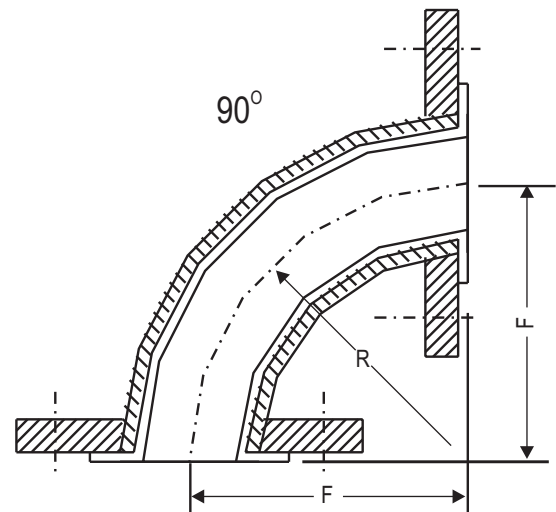
1. All dimensions are in millimeters.
2. Tolerance as follows:  
F=+0.0/-1.0 mm.
3. Intermediate combinations are available on special request.

**SPECIFICATIONS FOR LINED ELBOWS**

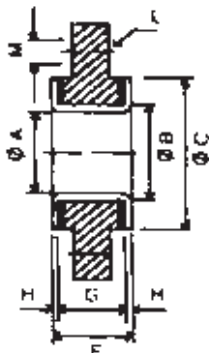
NB	F	F <sub>1</sub>	F <sub>2</sub>
15	89	44	13.6
20	89	44	15.2
25	89	44	16.7
32	95	51	19.3
40	102	57	21.0
50	114	63	22.6
65	127	76	25.7
80	140	76	27.3
100	165	102	27.3

1. All dimensions are in millimeters.
2. For Elbows Split Flanges can be supplied on request.
3. Lined Blind Flanges can be supplied in either RF/FF Type.
4. Tolerances as follows:  
 $F = +0.0/-5.0$  mm.  
 $F_1 = +0.0/-3.0$  mm.  
 $F_2 = +0.0/-1.0$  mm.

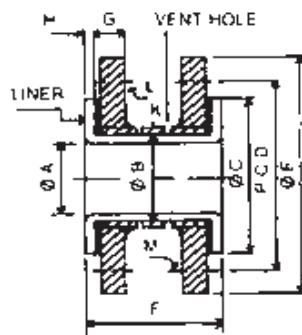
**ELBOW**



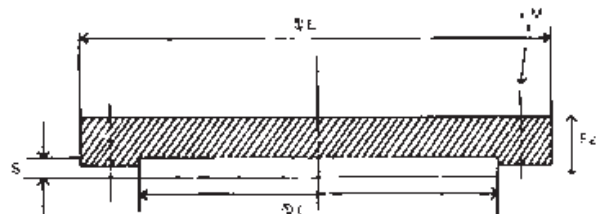
**BLIND FLANGE**



**LINED SPACER**



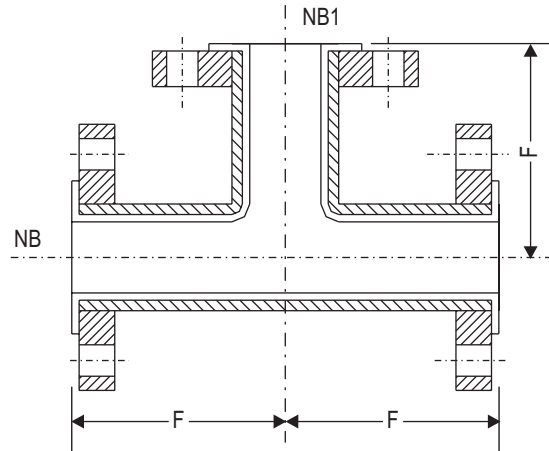
**BLIND FLANGE**



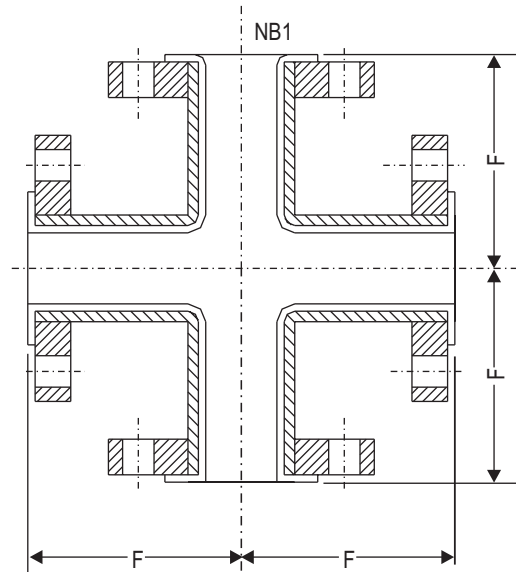
**SPECIFICATIONS FOR LINED TEE AND CROSS**

NB	NB1	F
15	15	89
20	20	89
20	15	89
25	25	89
25	20	89
25	15	89
32	32	95
32	25	95
32	20	95
40	40	102
40	32	102
40	25	102
50	50	114
50	40	114
50	32	114
65	65	127
65	50	127
65	40	127
80	80	140
80	65	140
80	50	140
100	100	165
100	80	165
100	65	165
125	125	190
125	100	190
125	80	190
150	150	203
150	125	203
150	100	203

**TEE-EQUAL/REDUCING**

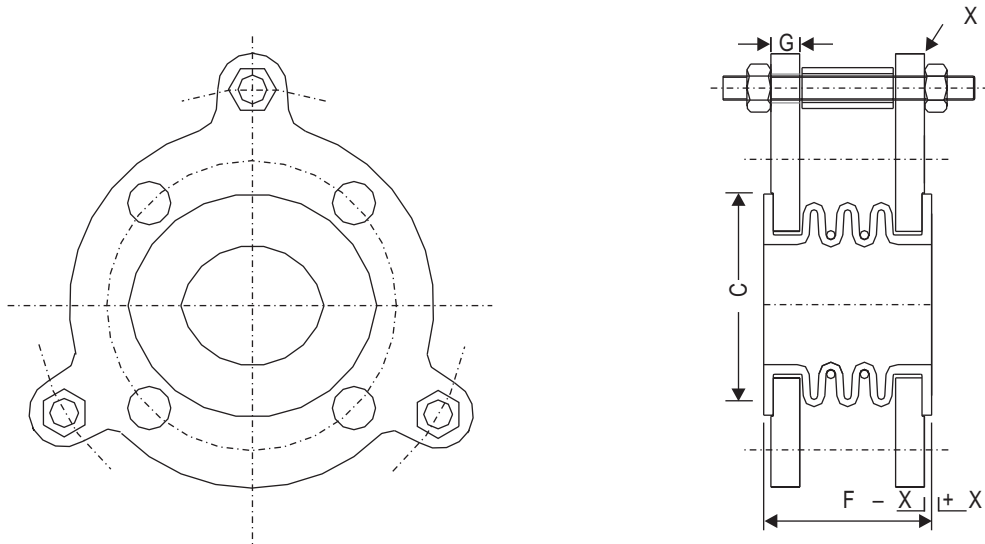


**CROSS-EQUAL/REDUCING**



1. All dimensions are in millimeters.
2. Split Flanges can be supplied on request.
3. Tolerance as follows:  
F=+0.0/4.0 mm.
4. FEP/PFA lining available.

## BELLOWS FOR LINED PIPE

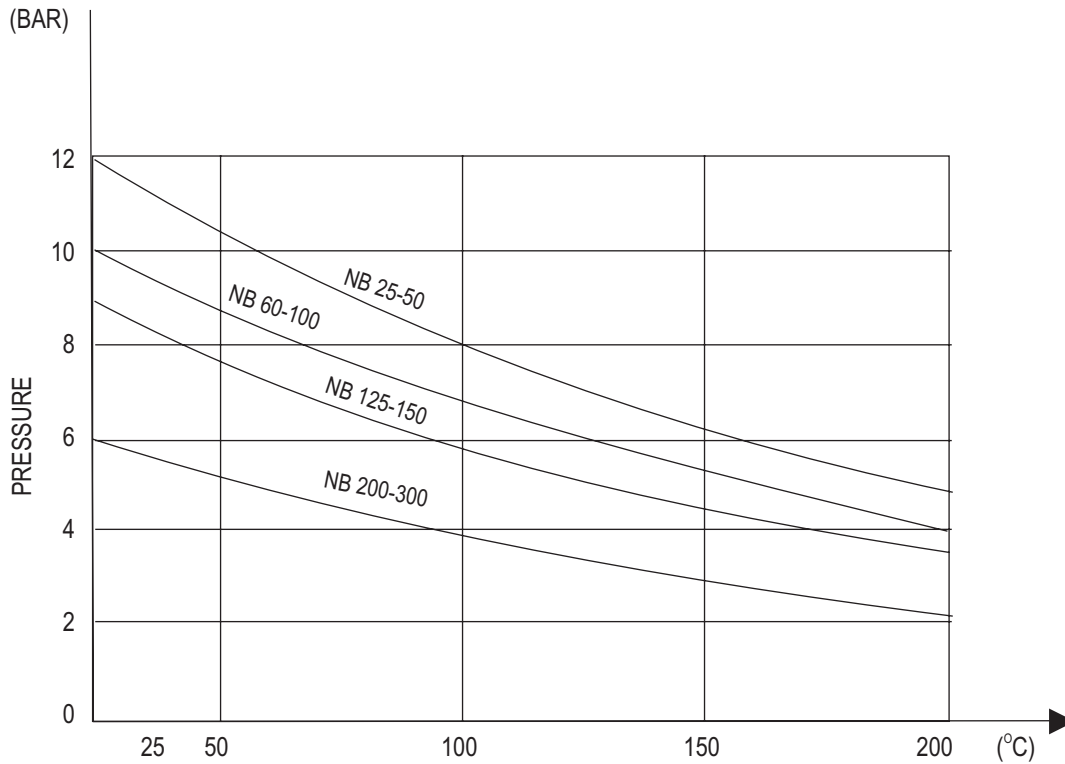


### SPECIFICATION FOR BELLOWS

NB	Max Pressure bar /23C	F	Ø C	G	DX +/-mm	N mm
15	12	50	34.9	11.5	7.5	3.5
20	12	50	42.7	13.0	7.5	3.5
25	12	50	50.8	14.5	10	5
32	12	50	63.5	15.0	10	5
40	12	55	73.0	17.5	10	5
50	12	70	92.1	19.5	15	8
65	10	80	104.8	22.5	20	8
80	10	100	127.0	24.0	25	8
100	10	100	157.2	24.0	25	12
125	9	100	185.7	24.0	25	12
150	9	100	215.9	25.5	25	12

1. All dimensions are in millimeters.
2. Flanges connections according to ANSI B 16.5
3. The figures for compensation DX shown above do not apply to lateral or angular installation at the same time.

### PRESSURE / TEMPERATURE CURVE



### PTFE BELLOWS FOR LINED PIPES

Bellows are made of pure virgin PTFE (Polytetrafluoroethylene). Paste extruded and contour moulded material. This manufacturing method guarantees an excellent structure of the material; symptoms of aging are practically excluded. Very long-term durability and low maintenance costs are assured.

Bellows serve for the compensation of

- Vibrations
- thermal strain and expansion
- axial, angular and radial motion,

and, because of the outstanding chemical resistance, PTFE are mostly used in chemical plants and pipings for aggressive media.

Bellows are manufactured in different types sized from NB 15 mm to 300 mm. The allowable operating pressure are depending on design (see graph above for details). The bellows can be used upto 210 °C. At extreme temperatures, the maximum pressure allowable is restricted.

Bellows are available with three convolutions for pressure.

Bellows are installed in PTFE Lined Carbon steel piping and equipment without additional gaskets. For use with piping and equipment made of glass, enamel and ceramics, We recommend to use PTFE gaskets, offered as accessory.

The sealing surfaces are covered with end plates and individually boxed for protection against mechanical damage. Limit bolts are preset to prevent over extension during operation.

## THE CHEMICAL PROCESS INDUSTRY CAN ALSO USE THE FOLLOWING PRODUCTS

### PTFE UNIVERSAL ROPE GASKET :

It is used as a Gasket on Flanged connections. Pressure Vessels and all other similar mating faces as well as packing for valves and similar gland applications.

### SPECIFICATIONS :

Dia. : 1.5 -19 mm

Length : 5000 - 10000 mm.

Available : In Square/Round Sections

### PTFE THREAD SEALANT TAPE :

This is pure unsintered PTFE in Tape form used for sealing threaded joints and connections of pipes, all metals, ceramic, monel carbon etc.

### SPECIFICATIONS :

Roll Length : 12000 mm

Width : 12.5 - 25.0 mm

Thickness : 0.075 mm

Varying sizes, width and thickness also, available on request.

### PTFE GASKETS - ENVELOPE / SOLID :

These gaskets are successfully used in Chemical Plants, Glass Lined equipment due to their high temperature, corrosion and aging resistance. We provide Envelope Gaskets in two forms viz. Milled and Slit forms. Solid Gaskets can be made to order in different types of shapes and sizes.

### \*SPECIFICATIONS :

Size : 12 mm onwards.

Thickness of Flap : 0.5 mm for order

### DETAILED INSTRUCTIONS AVAILABLE ON REQUEST

SINCE THERE ARE A WIDE VARIETY OF CHEMICAL PROCESSING. USE CONDITIONS AND SERVICE REQUIREMENTS, EACH OF WHICH MAY AFFECT THE LINERS DIFFERENTLY THE USER IS URGED TO CONSULT US BEFORE PUTTING THE COMPONENTS TO SPECIFIC SERVICE USES.

THE INFORMATION IN THIS BULLETIN IS INTENDED FOR USE BY PERSONS POSSESSING TECHNICAL SKILLS. AT THEIR OWN DISCRETION AND RISK. THE COMPANY ASSUMES NO OBLIGATION OR LIABILITY IN CONNECTION WITH ITS USE ALL DATA IN THIS BROCHURE IS BASED ON PRACTICAL EXPERIENCE AND IS INTENDED FOR INFORMATION AND GUIDANCE ONLY.

- **Code Nomenclature**
- 1 Technical Information..... 1**
- 2 Pipe..... 2**
- 3 Dip pipe / Sparger..... 3**
- 4 Instrument Tee / Sight Glass..... 4**
- 5 Reducers..... 5**
- 6 Reducing Flanges..... 6**
- 7 Elbow..... 8**
- 8 Tee Equql/Reducing..... 9**
- 9 Bellows for Lined Pipe..... 10**
- 10 Pressure/Temperature Curve 11**
- 11 The Chemical Process Industry Can Also use the following products 12**

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