Mersen

Expertise, our source of energy

ARMYLOR®

PTFE / PFA LINED PIPES AND FITTINGS ANSI B16.5

CONTENT

EXPERTISE

Mersen has an engineering team dedicated to customer services.

Our experts help study the best technical & economical solutions for your projects. This team can also assist our customers to produce isometric drawings in order to create a list of fittings / components.

MERSEN ANTICORROSION EQUIPMENT

The Mersen AntiCorrosion Equipment activity is internationally recognized for its expertise in the design and manufacture of process equipment, manufactured from corrosion resistant materials (graphite, silicon carbide, tantalum, zirconium, PTFE).

Mersen also has an in-depth knowledge of the process technologies requiring our AntiCorrosion Equipment and can provide offers from the basic equipment only, up to skid-mounted turn-key process packages.

Since 1964, Mersen has been offering an exhaustive range of PTFE / PFA lined pipe and fittings especially designed for conveying corrosive fluids in both the chemical and pharmaceutical industries.

THE PRODUCT RANGE CONSISTS OF :

- PTFE / PFA lined pipe and fittings
- PTFE bellows (expansion joints) and compensators
- Manifolds
- Dip pipes
- Double jacketed piping
- Custom made parts

DEFINITION

Available lining materials for our product range are as follows :

- **Virgin or anti-static* PTFE (Polytetrafluoroethylene), in accordance with ASTM D4894 & 4895 standards.**
- **Virgin or anti-static* PFA (perfluoroalkoxy), according to ASTM D3307** standard.**

** Conductive black PTFE or PFA* *** Also on request according to DIN 53455 standard*

GENERAL CHARACTERISTICS

Values indicated in the following table are given for virgin PTFE and PFA.
These characteristics can vary depending on the material grades from the various suppliers, the transformation process and the batch.

PROPERTIES	UNITS	PTFE	PFA
Physical			
Density	g/cm³	2.13 - 2.19	2.12 - 2.17
Water absorption : 24h thickness 3,2 mm	%	<0.01	0.03
Mechanical			
Tensile strength	MPa	20 - 40	27 - 32
Elongation at break	%	250 - 500	300 - 500
Modulus of elasticity under elongation	MPa	350 - 750	650 - 700
Modulus of elasticity under flexural stress	MPa	440 - 670	590 - 700
Hardness shore D mandhod		50 - 72	60 - 65
Thermal			
Flame propagation		hard	hard
Melting point	°C	327 and 342	300 to 310
Other transitions	°C	-90*,+123,* +27**	-80*, 90*
Maximum service temperature	°C	-200/+260	-150/+260
Temp. of deflection under load (1.82 MPa)	°C	50 - 60	50
Linear elongation coefficient	10^5 / °C	10 - 25	12
Thermal conductivity	W / m.K	0.24	0.25
Electrical			
Dielectric constant from 60 Hz to 107 Hz		2.2	2.1
Volume resistivity	Ω.cm	10^{18}	10^{18}
Surface resistivity	Ω	10^{17}	10^{17}
Spark test (thick.mm)	kV / mm.K	36(1)	80(2.3)

**amorphous phase, **crystal phase*

RECEIVING INSPECTIONS

Material certificates from the PTFE / PFA powder manufacturers are checked and identified with batch numbers. On request, FDA certificates (Food and Drug Administration) can be supplied.

NOMINAL THICKNESSES

Mersen proposes 3 ranges of PTFE / PFA thicknesses :

- ARMYLOR® G to operate under pressure
- ARMYLOR® V to operate under pressure and vaccum
- ARMYLOR® S for severe applications Ask us

} Thiknesses G and V are indicated in the table below

PTFE / PFA NOMINAL THICKNESS

NB	STRAIGHT LENGHTS		ELBOWS		TEES		CONC . / EXC. RED .		INSTRUMENT TEES		MANIFOLDS	
	G	V	G	V	G	V	G	V	G	V	G	V
1/2"		3.0		3.0		3.0		3.0		3.0		3.0
3/4"		3.0		3.0		3.0		3.0		3.0		4.0
1"		3.0		3.3		3.0		3.5		3.5		4.0
1" 1/2		3.0		4.0		3.5		3.5		3.5		6.0
2"		3.0		4.0		3.5		3.5		3.5		7.0
3"		3.5		4.5		4.5		4.0		4.0		9.0
4"	3.0	4.2	4.0	7.5		5.0		5.0		5.0	5.0	10.0
6"	4.0	5.3	5.0	9.5	6.0	10.0	5.0	5.3		6.0	6.0	11.0
8"	4.0	6.2	7.0	10.0	6.0	12.0	6.0	6.2		8.0	7.0	12.0
10"	4.0	7.0	7.0	11.0	7.0	12.0	6.5	7.0	7.0	12.0	7.0	12.0
12"	4.0	8.0	7.0	12.0	7.0	12.0	6.5	8.0	7.0	12.0	7.0	12.0
14"	4.5		8.0		8.0		8.0		8.0			
16"	4.5		8.0		8.0		8.0		8.0			
18"	4.5		8.0		8.0		8.0		8.0			
20"	4.5		8.0		8.0		8.0		8.0			
24"	4.5		4.5		4.5		4.5		4.5			

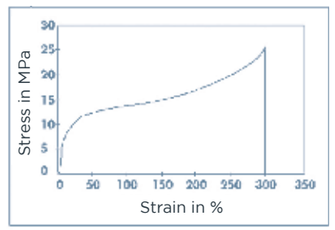
The minimal thickness of the PTFE tube is equal to the nominal minus 10% - The thickness of the flare cannot be lower than the nominal thickness, minus 20%.

TESTS ON PTFE / PFA

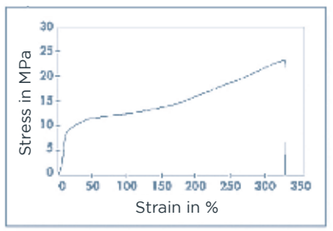
Physical and mechanical tests

For each manufacturing batch, Mersen checks the mechanical & physical properties.
Values for elongation at break point and tensile strength, together with regularity of the graph confirms that the liner sintering has re-established the isotropy of PTFE, which guarantees a low level or permeability.

Parallel direction



Perpendicular direction



Optimal density ensures a balance between a low permeability level and a good distortion during temperature cycles.

	MECHANICAL PROPERTIES		PHYSICAL PROPERTIES	
	Tensile strength	Elongation at break	Density	
PTFE Extruded Virgin Test according to standard	± 21 N/mm² ≤ (// Direction) ± 17 N/mm² ≤ (⊥ Direction) ASTM D4895	± 250% (// Direction) ± 200% (⊥ SDirection) ASTM D4895	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749
Antistatic Test according to standard	± 21 N/mm² ≤ (// Direction) ± 17 N/mm² ≤ (⊥ Direction) ASTM D4895	± 250% (// Direction) ± 200% (⊥ Direction) ASTM D4895	2.13 - 2.19 ASTM D792	2.12 - 2.18 DIN 53749
PTFE Molding Virgin Test according to standard	± 21 N/mm² ASTM D4894	± 250% ASTM D4894	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749
Antistatic Test according to standard	± 21 N/mm² ASTM D4894	± 250% ASTM D4894	2.14 - 2.19 *ASTM D792*	2.12 - 2.18 DIN 53749
PFA Virgin Test according to standard	± 26 N/mm² ASTM D3307	± 300% ASTM D3307	2.12 - 2.17 ASTM D792	2.12 - 2.17 DIN 53749
Antistatic Test according to standard	± 26 N/mm² ASTM D3307	± 300% ASTM D3307	2.11 - 2.17 ASTM D792	2.11 - 2.16 DIN 53749

The results comply with the ASTM F1545 standard

ANTISTATIC PTFE / PFA ELECTRICAL PROPERTIES

Transverse resistivity : < 10^7 Ω based on the BS ISO 2878 : 2005 standard
Surface resistivity : < 10^8 Ω based on the BS ISO 14309 : 2011 standard
Volume resistivity : <10^8 Ω based on the BS ISO 14309 : 2011 standard

Thanks to Mersen's expertise in lining technologies (PFA injection, extrusion of fine PTFE powders, Isomoulding). Mersen has optimised its manufacturing processes and PTFE / PFA thicknesses in order to limit the permeability rate.

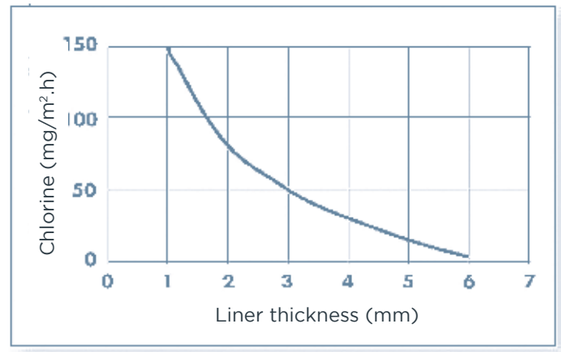
OPTIMIZING THE LINER THICKNESS - PERMEABILITY

SEVERAL FACTORS HAVE AN INFLUENCE :

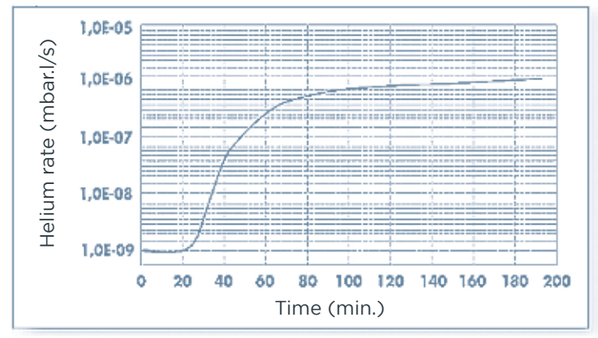
- **Thickness of the liner is the most significant factor.** The chart below shows the sharp decrease of permeability versus thickness.
- **Size of the ions or molecules :** the Helium permeability curve shows the ability of a very small molecule such as helium to pass through the PTFE / PFA.
- **Chemical nature of the product** : any chemical similarity between the material passing through and the material passed through increases permeability.
- **Temperature and pressure**: permeability increases with temperature and pressure.

EXAMPLES OF PERMEABILITY CURVES :

PTFE / PFA permeability curve



Helium permeability PTFE / PFA curve



STEEL PARTS

COMPONENTS

The table below shows the various steel components used for manufacturing of our standard pieces.
3.1 mill certificates in accordance with EN 10204 are available on request.
ASTM or JIS standards compliant steel grades, low temperature or stainless steel grades can be supplied on request. Please contact us for more information.

DESCRIPTION	PIPES / BODIES		FLANGES	
	DIMENSIONAL STANDARD	GRADE	DIMENSIONAL STANDARD	GRADE
SPOOLS	ANSI B36.10	ASTM 106 Gr B	ANSI B16.5	ASTM A 105
WELDED CONSTRUCTION ELBOWS	ANSI B16.9 / ANSI B16.28	ASTM A 234 WPB	ANSI B16.5	ASTM A 105
CAST STEEL ELBOWS AND TEES	ANSI B16.5	ASTM A 216 WCB	ANSI B16.5 (*)	ASTM A 216 WCB
WELDED CONSTRUCTION TEES	ANSI B16.10 / ANSI B16.9	ASTM A 106 Gr B ASTM A 234 WPB	ANSI B16.5	ASTM A 105
CONCENTRIC & ECCENTRIC REDUCERS	ANSI B16.9	ASTM A 234 WPB	ANSI B16.5	ASTM A 105
REDUCING FLANGES			ANSI B16.5 (*)	ASTM A 516 Gr 60
SPACERS	ANSI B36.10	ASTM A 106 Gr B	ANSI B16.5 (*)	ASTM A 516 Gr 60
WELDED CONSTRUCTION INSTRUMENT TEES		ASTM A 106 Gr B	ANSI B16.5	ASTM A 105 ASTM A 516 Gr 60
CAST STEEL INSTRUMENT TEES		ASTM A 216 WCB	ANSI B16.5 (*)	ASTM A 216 WCB

WELDING

Mersen is qualified in accordance with the European standards EN ISO 15614-1 (for WPQR's) and EN ISO 9606-1 (for WPQ's), with German ADM HP 5.3 and with ASME Section IX for GMAW, FCAW, GTAW and SAW processes. These qualifications are renewed on a regular basis, either by Mersen IWE (International Welding Engineer) or by Third Parties (German TÜV or French Apave). Suppliers' assessments are performed by Mersen in order to make sure that the same quality standards are implemented.

FLARED STUB ENDS

Spools are built with 2 loose flanges on collars obtained by cold forming of the steel tube, from DN 15 to DN 300. This process has been assessed by Notified Bodies and found compliant with the essential requirements of the PED. A loose flange stop can be supplied on request.

VENT HOLES

THE STEEL PARTS OF THE PTFE / PFA LINED FITTINGS ARE DRILLED WITH VENT HOLES IN ORDER TO :

- **Prevent any back pressure between the metallic housing and the liner.**
- **Detect any leakage during pressure tests.**
- **Quickly detect any sign of corrosion.**

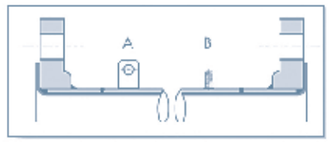
Spools with length below 500 mm have one 3 mm diameter vent hole in the middle of the piece. Those above 500 mm are fitted with two vent holes located about 150 mm from each end. The fittings have at least one 3 mm diamander vent hole. Reducing flanges, blind flanges and spacers do not have any vent holes. In the case of particular specifications or thermal insulation piping, vent bosses can be welded to the vent holes.

VENT BOSSES

If vent holes must be identified quickly or when the piping is thermal insulated, a coupling can be welded on to the vent holes. In the case of different thermal insulation thicknesses, an extension stem can be screwed on to the coupling.

ELECTRICAL CONTINUITY

The electrical continuity of lined piping can be ensured by connecting each individual component together by using conductors linked to earthing lugs.
The latter are welded in the middle of the steel part for fittings and spools below 500 mm long and at about 150 mm from the back side of each flange for spools above 500 mm long.
Types A or B earthing lugs can be proposed on request.
Standard materials are 304 or 316 stainless steel grades.



Other materials can be supplied on request.

PAINTING

The standard coating is a 40 µm thick zinc epoxy primer coating on sand blasted steel, in accordance with the S.A 2.5 cleanliness level. Other surface preparations, undercoats or topcoats can be applied on request.

LINED COMPONENTS

DIMENSIONAL TOLERANCES

The lined pieces and their dimensions are indicated in pages 17 to 35.
All the lined pieces are built using the following tolerances :

	DIMENSION	DIMENSIONAL TOLERANCE	ANGULAR TOLERANCE
LENGTHS	0 - 315 mm	+0; -3 mm	± 0.5°
	315 - 1000 mm	+0; -4 mm	± 0.5°
	1000 - 6000 mm	+0; -5 mm	± 0.5°
DIAMETERS	DN 25 - 100	+0; -3 mm	± 0.5°
	DN 125 - 200	+0; -4 mm	± 0.5°
	DN 250 - 600	+0; -5 mm	± 0.5°

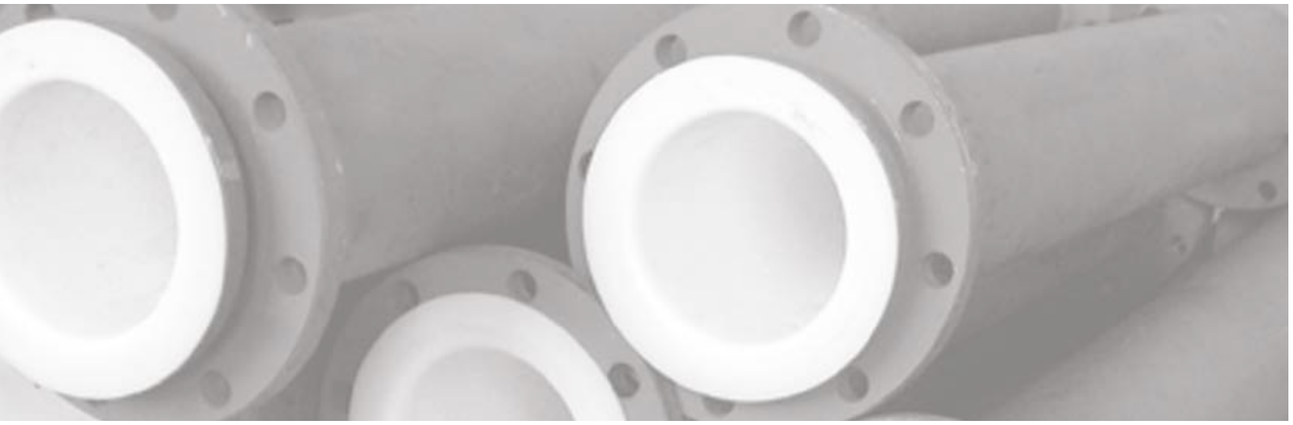
TEMPERATURE CYCLE TESTS

The pieces tested undergo 100 alternate steam / cold water cycles, according to the ASTM F1545 standard.
Steam is absorbed by the liner under the influence of both temperature and pressure.
Vacuum resistance of the liner is then proved due to significant mechanical stresses caused by the sudden pressure drop combined with fast cooling.

VACUUM RESISTANCE

NB	1/2”	3/4”	1”	1” 1/2	2”	3”	4”	6”	8”	10”	12”	14”	16”
ARMYLOR® G	Vacuum 2 Torr 150° C						No vacuum resistance						
ARMYLOR® V	Vacuum 2 Torr 230° C						Vacuum 2 Torr 150°C			2 Torr 100°C			
ARMYLOR® S							Vacuum according to particular specifications						

Units : 760 Torrs = 760 mmHg = 1 bar = 1kg/cm = 10 Pa = 14.5 Psi



QUALITY CONTROL

INSPECTIONS AND TESTS PROGRAM

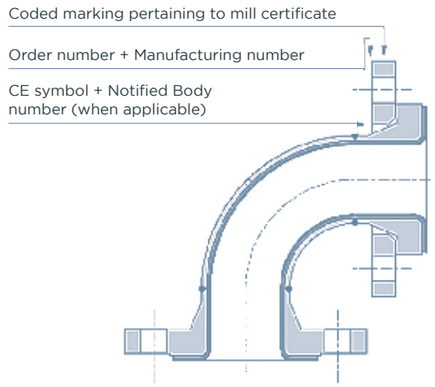
MERSEN manufactures PTFE-lined piping and fittings compliant with the the European Pressure Equipment Directive 2014/68/UE (previously 97/23/CE). Type agreements are awarded by the APAVE Notified Body (CE 0060) for the whole range of ARMYLOR® products. In addition to assessments carried out by Third Parties and continuous internal audits, a complete inspection and tests program is set during the entire manufacturing process :

- **Raw material (fluoropolymers) :** acceptance criteria at receiving inspections, physical properties of the liners monitored throughout the manufacturing process...
- **Spark tests are performed on each PTFE and PFA-lined piece in the following conditions :** voltage of 5000* E (E = thickness of liner in mm) with a maximum of 25000 V.
- **Dimensional and visual examination of the liners and steel parts :** the weld aspect, the overall dimensions, the size of the collars, the liner thickness, the absence of surface defects and the painting thickness are checked.
- **Non-destructive examinations** are carried out when required by the applicable standards or on request. RT and PT are performed by COFREND level II qualified personnel.
- **Pressure tests :** depending on the lining process, a hydrostatic or a pneumatic test is performed. A hydrostatic test is performed on pieces fitted with vent holes, injected or produced from tubes. A pneumatic test is carried out on isomolded pieces and on some pieces produced from extruded liners.

TRACEABILITY AND MARKING

IN ADDITION TO THE INSPECTIONS AND TESTS PROGRAM, A FULL TRACEABILITY SYSTEM OF MATERIALS IS IMPLEMENTED :

- **Steel parts** : a coded marking system with unique traceability to the mill certificates is used. Each piece is cold stamped. Marking transfers by Mersen qualified personnel are approved by Mersen’s Notified Body.
- **Finished product** : The following information is stamped on the finished piece :
  - The initials of Mersen, the order number and the piece number (Manufacturing number)
  - The «CE» symbol followed by the Notified Body registration number when applicable.
- **Traceability of documents** : total traceability is ensured with the same method for both steel and lining materials.



Additionnal marking can be done.
On request, each part can be identified thanks to a heat transfer printed sticky label that shows piece reference and isometric number.

INSTALLATION PROCEDURE

Installation and maintenance instructions are provided in the user's manual delivered with the products. Specific items are highlighted here after.

PRECAUTIONS

The lined steel components are delivered with wooden or plastic blanks installed to protect the PTFE / PFA flange faces. Remove these protective blanks when the components are about to be connected only : they shall be refitted after each inspection and when the piece is withdrawn from the installation. Once the blanks have been removed, the greatest care is required : no contact with the ground, absence of any sharp object that could damage the liner. **Never weld on lined parts.**

CLEANING

Flared surface must be carefully cleaned prior to connection.

BOLT TIGHTENING

The assembly of PTFE / PFA lined components does not require any gaskets except when materials of different natures are being coupled or during successive assembling and dismantling operations.

TIGHTENING BOLTS :

- **Insert** the washers.
- **Clean** and grease the bolts.
- **Tighten** nuts by hands.
- **Tighten** each bolt using a torque wrench, keeping to the torque values specified in the table beside.
- Cross-tightening as with any flange connection.

Tightening torque values are given for PTFE / PFA and may vary depending on greasing and the condition of the nuts and bolts.

Values are given for PN 10 flanges. They are indicated for room temperature and must always be checked in cold conditions, after 24 hours of operation, then checked periodically.

THE TIGHTENING TORQUE VALUES INDICATED BESIDE APPLY TO :

Class 8.8 steel nuts
(resistant to 800 N/mm² rupture, elasticity limit of 640 N/mm²).

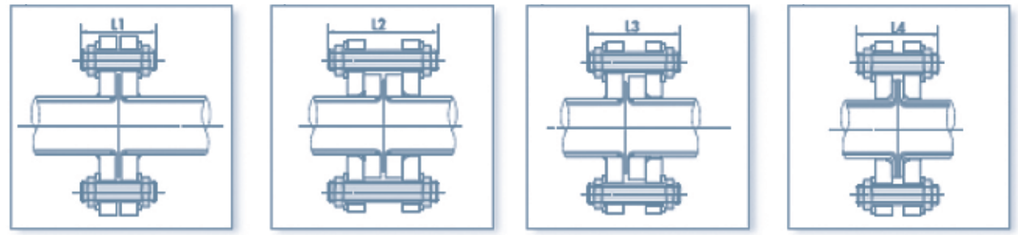
0.12. nut friction **coefficient.**

NB	BOLTS mm	TORQUE N.m
1/2"	4 x 1/2"	20
3/4"	4 x 1/2"	20
1"	4 x 1/2"	30
1" 1/2	4 x 1/2"	30
2"	4 x 5/8"	60
3"	4 x 5/8"	60
4"	8 x 5/8"	60
6"	8 x 3/4"	110
8"	8 x 3/4"	110
10"	12 x 7/8"	160
12"	12 x 7/8"	180
14"	12 x 1"	200
16"	16 x 1"	190
18"	16 x 1" 1/2	370
20"	20 x 1" 1/8	370
24"	20 x 1" 1/4	530

BOLT LENGTHS

The table below specifies the recommended lengths of threaded stems for the various assemblies.

FIXED F. / FIXED F. | LOOSE F. / LOOSE F. | FIXED F. / LOOSE F. | FLARE STUB END



THE DIMENSIONS INDICATED REFER TO :

- **A tightening torque equal** equal to 1/3 the diameter of the threaded stems.
- **A nut height equal** to the diameter of the threaded stems.

ASA 150

NB	L1 mm	L2 mm	L3 mm	L4 mm
NB 1/2"	75	95	85	
NB 3/4"	80	100	90	
NB 1"	80	105	90	85
NB 11/2"	90	115	100	85
NB 2"	100	125	110	95
NB 3"	110	140	125	105
NB 4"	110	140	125	105
NB 6"	125	165	145	125
NB 8"	135	175	155	130
NB 10"	150	195	175	
NB 12"	155	205	175	
NB 14"	170	220	195	
NB 16"	175	225	195	
NB 18"	185	235	215	
NB 20"	195	245	220	
NB 24"	205	260	230	

ASA 300

NB	L1 mm	L2 mm	L3 mm	L4 mm
NB 1/2"	80	100	90	
NB 3/4"	90	115	100	
NB 1"	95	120	105	95
NB 11/2"	110	140	125	105
NB 2"	110	140	125	105
NB 3"	130	165	145	120
NB 4"	135	180	155	120
NB 6"	150	195	170	135
NB 8"	170	225	195	155
NB 10"	195	255	225	
NB 12"	210	275	240	
NB 14"	215	290	250	
NB 16"	235	315	275	
NB 18"	240	330	285	
NB 20"	245	345	290	
NB 24"	270	380	325	

VENT HOLES

Vent holes must not be obstructed by thermal insulation or painting. Where thermal insulation is fitted, vent extensions should be provided. When pipes are operated for the first time, air or water trapped inside at the moment of assembly may escape through the vent holes. It is recommended, during periodic inspection, to check that no trace of leakage is visible around the vent holes. The latter also act as corrosion indicators.

WEIGHT

The weight (kg) of each piece is indicatedon the corresponding tables. Due to the various construction methods, the weights are typical values only. The tolerance is +/- 10%.

SUPPORTS

Elements must be supported using collars that are not welded on the lined piping. **Never weld on lined parts.** However, supporting elements may be welded prior to lining.

CODING SYSTEM AND REFERENCES

Each element has its own unique reference which allows its identification.
This reference is composed on 16 alphanumeric characters. In some cases, the character can be «-» if refers to standard. The references that are mentioned in the dimensional tables are the standard ones.

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
DIMENSION	CONNECTION	RANGE	LINING	PIECES TYPE	NB	NB LOOSE FLANGES	CONSTRUCTION	STEEL SHELL	LINING PROCESS	PARTICULARITY
D = DIN	1 = PN10	- = STANDARD G	- = VIRGIN STANDARD	L = PIPE + LENGTH IN MM	SEE TABLE UNDER	1, 2, 3, 4	- = STANDARD	- = STANDARD	- = PASTE EXTRUSION	- = STANDARD
A = ANSI	2 = PN 20 / 150 LBS	V = PRESSURE & VACCUM	A = ANTISTATIC	C = ELBOW + ANGLE			C = TUB END COLLAR	K = CAST STEEL	M = ISO-MOLDING	A = SUPPORT LEG
S = SPECIAL	3 = PN 16	S = SPECIAL					P = SLIP ON FLANGE	R = LOW TEMPERATURE STEEL	T = TRANSFER MOLDING	B = COUPLING
	4 = PN 50 / 300 LBS						W = FLARE	X = STAINLESS STEEL	According to each product	C = SUPPORT LEG + COUPLING
	5 = PN 40							S = SPECIAL		

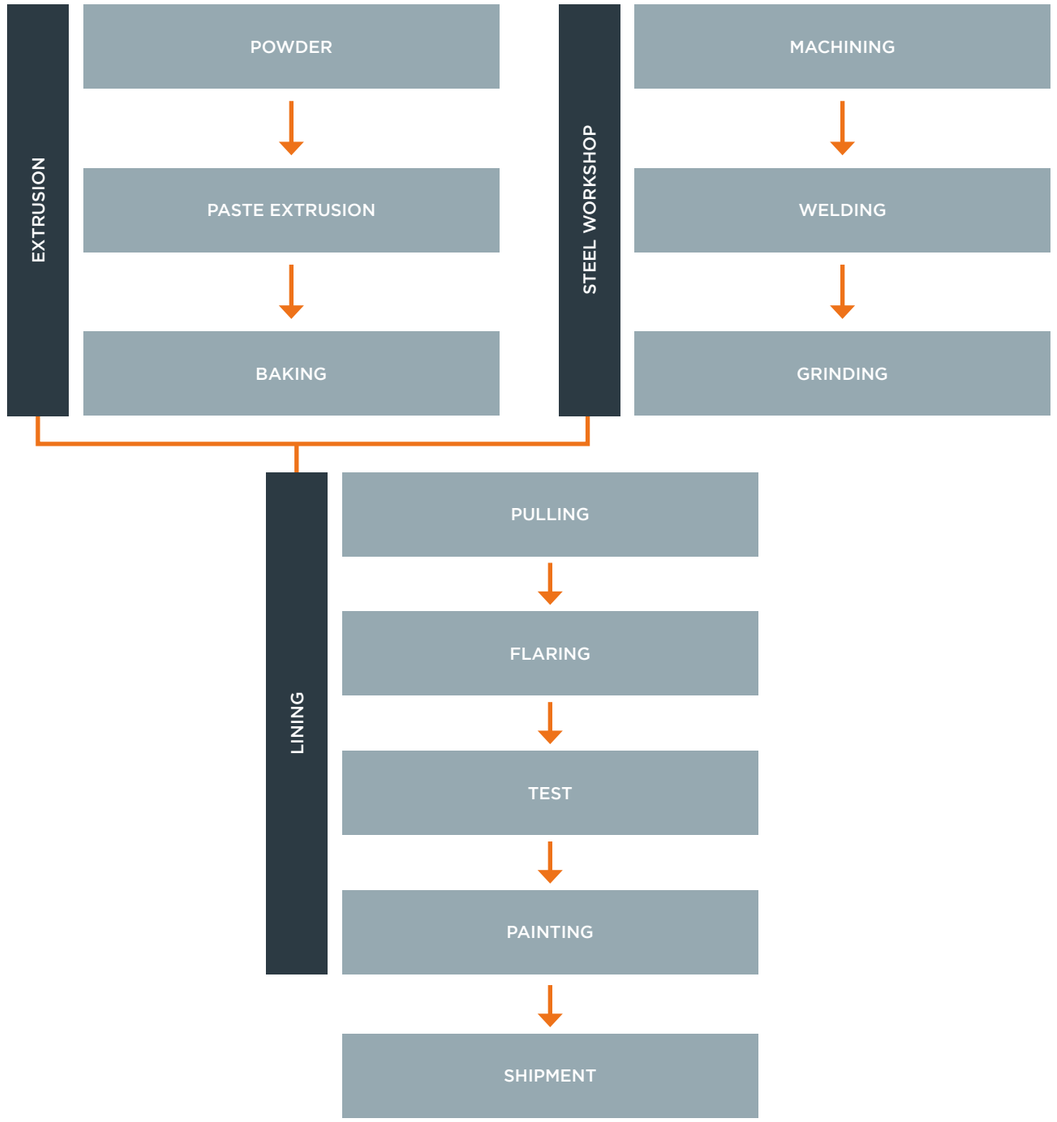
REP	NB	REP	NB	REP	NB
H	1/2’’	Q	4’’	X	16’’
J	3/4’’	S	6’’	Y	18’’
K	1’’	T	8’’	Z	20’’
M	1’’ 1/2	U	10’’	B	24’’
N	2’’	V	12’’		
P	3’’	W	14’’		

Examples :

D3V-L1234T--XW-A :
DIN, PN16, vaccum range, 1234 mm straight length, DN200, inox steel, welding neck, earthing lug.

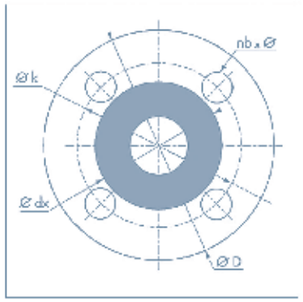
D1--C45--P-1 :
DIN, PN10, 45° elbow, DN80, 1 loose flange.

MANUFACTURING PROCESS

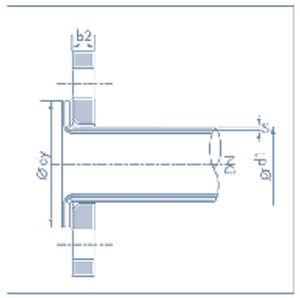


PRODUCTS DATA SHEETS

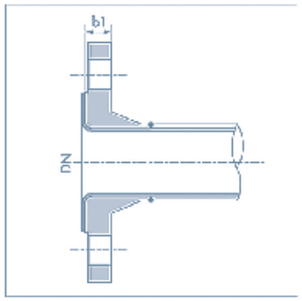
ANSI 150 LBS FLANGES AND TUBES



Flange (front view)



Flared stub end type C
(loose)



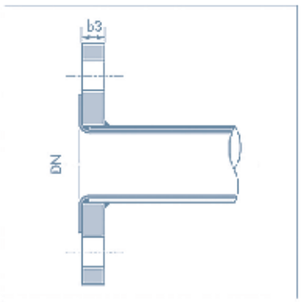
Welding neck
type W (Fixed)

DIMENSIONAL TOLERANCES

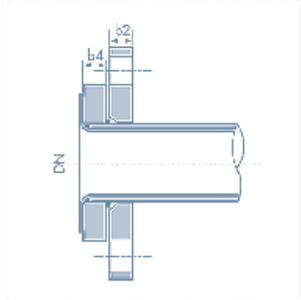
Entire flanged products range can be equipped with loose or fixed flanges on request.

	DIAMETERS				THICKNESS				DRILLING PN10				STEEL TUBES	
NB	D	dx*	dy	dz	k	b1	b2	b3	holes			bolting	d1	s
	mm	mm	mm	mm	mm	mm	mm	mm	nb	x	ø	UNC	mm	mm
1/2"	89	31		42	60.3	11.1	9.5	10	4	16	1/2	26.7	2.9	2.9
3/4"	99	39		52	69.0	12.7	11.1	12	4	16	1/2	26.7	2.9	2.3
1"	108	47	51	60	79.4	14.3	12.7	12	4	16	1/2	33.4	3.4	2.6
1" 1/2	127	68	72	73	98.4	17.5	15.9	12	4	16	1/2	48.3	3.7	2.6
2"	152	87	90	92	120.6	19.0	17.4	14	4	20	5/8	60.3	3.9	2.6
3"	191	117	125	127	152.4	23.8	22.2	16	4	20	5/8	88.9	5.5	2.9
4"	229	150	155	157	190.5	23.8	22.2	16	8	20	5/8	114.3	6.0	2.9
6"	279	203	210	216	241.3	25.4	23.8	18	8	23	3/4	168.3	7.1	3.2
8"	343	255	262	270	298.4	28.6	27.0	20	8	23	3/4	219.1	8.2	3.6
10"	406	311		324	361.9	30.2	28.6	22	12	26	7/8	273.0	7.8	4.0
12"	485	365		381	431.8	32.7	31.1	24	12	26	7/8	323.8	8.4	4.5
14"	535	393		413	476.2	34.9	33.3	25	12	29	1	355.6	7.9	6.3
16"	597	450		470	539.7	36.5	34.9	25	16	29	1	406.4	7.9	6.3
18"	635	514		533	577.8	39.7	38.1	25	16	32	1.1/8	457.2	7.9	7.1
20"	699	565		584	635.0	42.9	41.3	25	20	32	1.1/8	508.0	9.5	8.0
24"	813	666		692	749.3	47.6	46.0	25	20	35	1.1/4	609.8	9.5	8.5

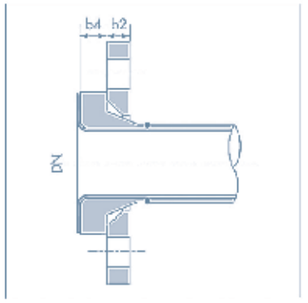
** Tolerance 5%*



Slip-on
Type P (Fixed)



Collar
+ slip-on type P (loose)



Collar
+ slip-on type W

ANSI 300 on request

Please see page 33

FLANGED SPOOLS

LINING

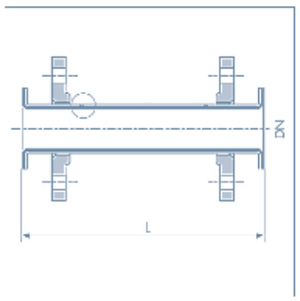
- **VIRGIN PTFE :** NB 1/2" – NB 24"
- **ANTISTATIC PTFE, C4 = A :** NB 1/2" – NB 16"

Standard construction : 2 loose flanges
- Type C : NB 1/2" to NB 12", C14 = C

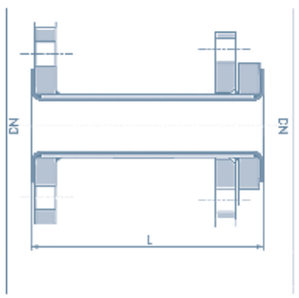
On request : 1 fixed flange, 1 loose flange
- Type P : NB 1/2" to NB 14"
- Type W : C14 = W

NB	L min.	L max.	Weight	Pair flanges weight	REFERENCE														
	mm	mm	kg/m		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2"	85	6000	2	0.9	A	2	-	-	L	x	x	x	x	H						
3/4"	85	6000	2	1.3	A	2	-	-	L	x	x	x	x	J						
1"	85	6000	2	2.1	A	2	-	-	L	x	x	x	x	K						
1"1/2	90	6000	5	3.2	A	2	-	-	L	x	x	x	x	M						
2"	100	6000	7	5.1	A	2	-	-	L	x	x	x	x	N						
3"	110	6000	14	9.3	A	2	-	-	L	x	x	x	x	P						
4"	120	6000	19	12.9	A	2	-	-	L	x	x	x	x	Q						
6"	120	6000	34	17.8	A	2	-	-	L	x	x	x	x	S						
8"	130	6000	53	28.2	A	2	-	-	L	x	x	x	x	T						
10"	150	6000	64	38.5	A	2	-	-	L	x	x	x	x	U						
12"	150	6000*	65	60.9	A	2	-	-	L	x	x	x	x	V						
14"	150	5000	85	76.1	A	2	-	-	L	x	x	x	x	W						
16"	150	3500	98	95.2	A	2	-	-	L	x	x	x	x	X						
18"	150	6000	110	108	A	2	-	-	L	x	x	x	x	Y						
20"	160	6000	132	136	A	2	-	-	L	x	x	x	x	Z						
24"	180	4500	161	172	A	2	-	-	L	x	x	x	x	B						

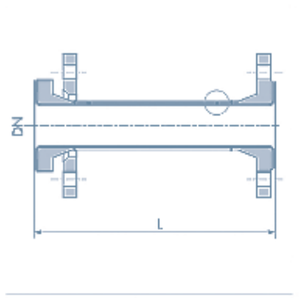
** For vacuum thickness, L max = 4500 xxxx : length in mm*



Type C construction



Type P construction



Type W construction

ELBOWS

LINING

- **VIRGIN PTFE :** NB 1/2" – NB 24"
- **ANTISTATIC PTFE, C4 = A :** NB 1/2" – NB 16"

Standard construction : 2 fixed flanges
- Type K : NB 1" to NB 4", C13 = K
- Type W : superior NB 4"

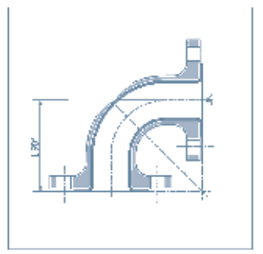
On request : 1 fixed flange + 1 loose flange
- C12 = 1

NB		L (mm)				Weight (kg)				REFERENCE																		
		α=90°	α=45°	α=60°	α=30°	90°	45°	60°	30°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15	16
1/2"		65	44●	52	40	1.0	0.9	0.9	0.9	A	2	-	-	C	●	●	x	x	H							
3/4"		75	44●	72	59	1.4	1.3	1.3	1.3	A	2	-	-	C	●	●	x	x	K							
1"		89	44(1)●	98	77	2.2	2.1	2.1	2.0	A	2	-	-	C	●	●	x	x	L							
1"1/2		102	57●	92	78	3.8	3.4	3.5	3.3	A	2	-	-	C	●	●	x	x	M							
2"		114	64●	110	86	5.9	5.3	5.5	5.1	A	2	-	-	C	●	●	x	x	N							
3"		140	76●	110	75	11.5	10.0	10.5	9.5	A	2	-	-	C	●	●	x	x	P							
4"		165	102●	135	90	16.7	14.2	15.1	13.4	A	2	-	-	C	●	●	x	x	Q							
6"		203	127●	180	110	26.6	21.2	22.9	19.4	A	2	-	-	C	●	●	x	x	S							
8"		229	140●	235	140	44.3	34.7	37.9	31.6	A	2	-	-	C	●	●	x	x	T							
10"		279	165●			62.4	48.4			A	2	-	-	C	●	●	x	x	U							
12"		305	190●			86.3	70.7			A	2	-	-	C	●	●	x	x	V							
14"		356	190●			117	93.1			A	2	-	-	C	●	●	x	x	W							
16"		450	203●			156	121			A	2	-	-	C	●	●	x	x	X							
18"	x	475	216●			179	138			A	2	-	-	C	●	●	x	x	Y							
20"	x	810**	x 343*●			538	341			A	2	-	-	C	●	●	x	x	Z							
24"	x	974**	x 412*●			693	439			A	2	-	-	C	●	●	x	x	B							

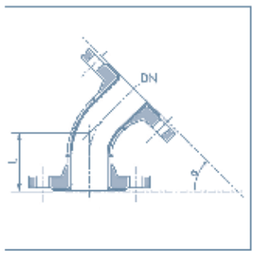
** : 2 parts construction ** : 3 parts construction x : Does not conform to ANSI NB 16.5 standard*

● : Angle in degree : 90, 45, 60 or 30 ● : Assembly not possible with one loose flange

The 30 ° and 60° elbows are not included in the ANSI B 16.5 standard



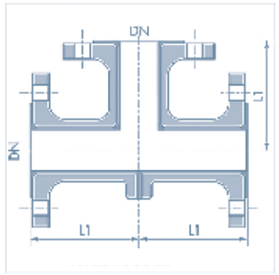
Type K



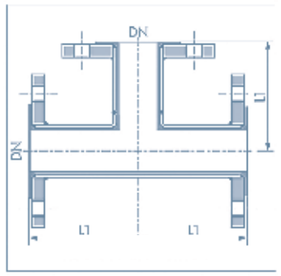
Type W

Standard fixed flanges elbow = 90°/60°/30°

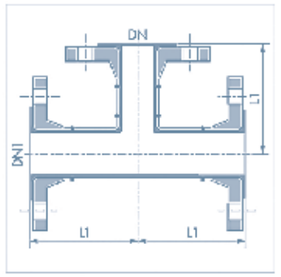
EQUAL TEES



Type K



Fixed flanges type P



Fixed flanges type W

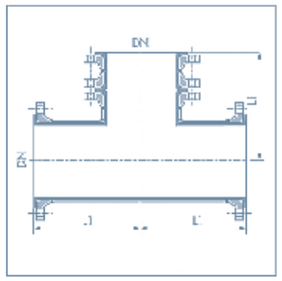
LINING

- **VIRGIN PFA :** NB 1/2'' – NB 3''
- **ANTISTATIC PFA :** NB 1/2'' – NB 3'', C4 = A
- **VIRGIN PTFE :** NB 4'' – NB 24''
- **ANTISTATIC PTFE :** NB 4'' – NB 16'', C4 = A

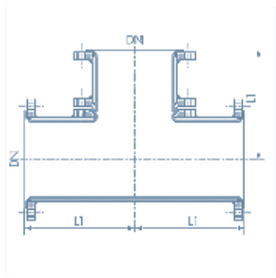
NB	L mm	Weight kg	REFERENCE															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2''	65	1.6	A	2	-	-	T	E	-	-	-	H						
3/4''	75	2.2	A	2	-	-	T	E	-	-	-	J						
1''	89	3.5	A	2	-	-	T	E	-	-	-	K						
1'' 1/2	102	5.9	A	2	-	-	T	E	-	-	-	M						
2''	114	9.2	A	2	-	-	T	E	-	-	-	N						
3''	140	17.9	A	2	-	-	T	E	-	-	-	P						
4''	165	26.1	A	2	-	-	T	E	-	-	-	Q						
6''	203	41.7	A	2	-	-	T	E	-	-	-	S						
8''	229	68.8	A	2	-	-	T	E	-	-	-	T						
10''	279	96.8	A	2	-	-	T	E	-	-	-	U						
12''	305	132	A	2	-	-	T	E	-	-	-	V						
14''	356*	215	A	2	-	-	T	E	-	-	-	W						
16''	381**	266	A	2	-	-	T	E	-	-	-	X						
18''	419**	308	A	2	-	-	T	E	-	-	-	Y						
20''	457**	396	A	2	-	-	T	E	-	-	-	Z						
24''	559**	520	A	2	-	-	T	E	-	-	-	B						

Standard construction :
- Type P : NB 1/2'' to NB 3'' and NB 14'' to NB 24''
- NB 1'' to NB 4'', C13 = K
- Type W : NB 4'' to NB 12''

On request :
- 3 loose flanges : C12 = 3



* Fixed flanges type W



** Fixed flanges type P

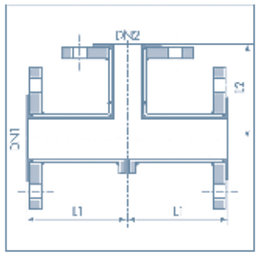
REDUCING TEES

LINING

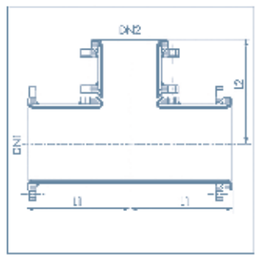
- **VIRGIN PFA :** NB 3/4'' – NB 3''
- **ANTISTATIC PFA :** NB 3/4'' – NB 3'', C4 = A
- **VIRGIN PTFE :** NB 4'' – NB 8''
- **ANTISTATIC PTFE :** NB 4'' – NB 8'', C4 = A

Standard construction :
- Type K: Fixed flanges, NB 1'' to NB 3'', C13 = K
- Type P : Fixed flanges

On request :
- 3 loose flanges C12=3



Construction type K



Construction type P

NB1	NB2	L mm	Weight kg	REFERENCE														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/4''	1/2''	75	2.0	A	2	-	-	T	R	-	-	-	J	H					
1''	1/2''	89	2.9	A	2	-	-	T	R	-	-	-	K	H					
	3/4''	89	3.1	A	2	-	-	T	R	-	-	-	K	J					
1'' 1/2	1/2''	102	4.6	A	2	-	-	T	R	-	-	-	M	H					
	3/4''	102	4.8	A	2	-	-	T	R	-	-	-	M	J					
	1''	102	5.2	A	2	-	-	T	R	-	-	-	M	K					
2''	1/2''	114	6.8	A	2	-	-	T	R	-	-	-	N	H					
	3/4''	114	7.0	A	2	-	-	T	R	-	-	-	N	J					
	1''	114	7.4	A	2	-	-	T	R	-	-	-	N	K					
	1 1/2''	114	8.2	A	2	-	-	T	R	-	-	-	N	M					
3''	1''	140	13.5	A	2	-	-	T	R	-	-	-	P	K					
	1 1/2''	140	14.3	A	2	-	-	T	R	-	-	-	P	M					
	2''	140	15.4	A	2	-	-	T	R	-	-	-	P	N					
	4''	165	19.3	A	2	-	-	T	R	-	-	-	Q	K					
	1 1/2''	165	20.2	A	2	-	-	T	R	-	-	-	Q	M					
4''	2''	165	21.2	A	2	-	-	T	R	-	-	-	Q	N					
	3''	165	23.9	A	2	-	-	T	R	-	-	-	Q	P					
	6''	203	30.8	A	2	-	-	T	R	-	-	-	S	K					
	1 1/2''	203	31.7	A	2	-	-	T	R	-	-	-	S	M					
6''	2''	203	32.8	A	2	-	-	T	R	-	-	-	S	N					
	3''	203	35.6	A	2	-	-	T	R	-	-	-	S	P					
	4''	203	37.9	A	2	-	-	T	R	-	-	-	S	Q					
	8''	229	50.7	A	2	-	-	T	R	-	-	-	T	K					
	1 1/2''	229	51.6	A	2	-	-	T	R	-	-	-	T	M					
8''	2''	229	52.7	A	2	-	-	T	R	-	-	-	T	N					
	3''	229	55.5	A	2	-	-	T	R	-	-	-	T	P					
	4''	229	57.8	A	2	-	-	T	R	-	-	-	T	Q					
	6''	229	61.7	A	2	-	-	T	R	-	-	-	T	S					

REDUCING TEES

LINING

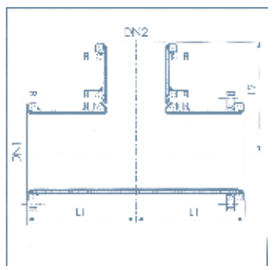
- **VIRGIN PTFE :** NB 10’’ – NB 24’’
- **ANTISTATIC PTFE C4 = A :** NB 10’’ – NB 16’’

Standard construction :
- Type P : fixed flanges
- Type W : fixed flanges

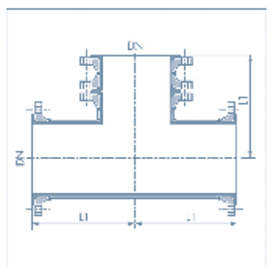
On request :
- Loose flange : C12 = 3

NB1	NB2	L mm	Weight kg	REFERENCE															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10’’	4’’	279	78,8	A	2	-	-	T	R	-	-	-	U	Q					
	6’’	279	83,0	A	2	-	-	T	R	-	-	-	U	S					
	8’’	279	90,6	A	2	-	-	T	R	-	-	-	U	T					
12’’	4’’	305	104	A	2	-	-	T	R	-	-	-	V	Q					
	6’’	305	108	A	2	-	-	T	R	-	-	-	V	S					
	8’’	305	115	A	2	-	-	T	R	-	-	-	V	T					
	10’’	305	122	A	2	-	-	T	R	-	-	-	V	U					
14’’	4’’	356	145	A	2	-	-	T	R	-	-	-	W	Q					
	6’’	356*	152	A	2	-	-	T	R	-	-	-	W	S					
	8’’	356*	165	A	2	-	-	T	R	-	-	-	W	T					
	10’’	356*	176	A	2	-	-	T	R	-	-	-	W	U					
	12’’	356*	197	A	2	-	-	T	R	-	-	-	W	V					
16’’	4’’	381*	177	A	2	-	-	T	R	-	-	-	X	Q					
	6’’	381*	183	A	2	-	-	T	R	-	-	-	X	S					
	8’’	381*	196	A	2	-	-	T	R				X	T					
	10’’	381*	207	A	2	-	-	T	R				X	U					
	12’’	381*	228	A	2	-	-	T	R	-	-	-	X	V					
	14’’	381**	246	A	2	-	-	T	R	-	-	-	X	W					
18’’	8’’	419*	225	A	2	-	-	T	R	-	-	-	Y	T					
	10’’	419	236	A	2	-	-	T	R				Y	U					
	12’’	419	257	A	2	-	-	T	R				Y	V					
	14’’	419	276	A	2	-	-	T	R	-	-	-	Y	W					
20’’	8’’	457	281	A	2	-	-	T	R	-	-	-	Z	T					
	10’’	457	292	A	2	-	-	T	R	-	-	-	Z	U					
	12’’	457	313	A	2	-	-	T	R	-	-	-	Z	V					
	14’’	457	332	A	2	-	-	T	R	-	-	-	Z	W					
	16’’	457	352	A	2	-	-	T	R	-	-	-	Z	X					
	18’’	457	364	A	2	-	-	T	R	-	-	-	Z	Y					
24’’	10’’	559	380	A	2	-	-	T	R	-	-	-	B	U					
	12’’	559	401	A	2	-	-	T	R	-	-	-	B	V					
	14’’	559	421	A	2	-	-	T	R	-	-	-	B	W					
	16’’	559	441	A	2	-	-	T	R	-	-	-	B	X					
	18’’	559	455	A	2	-	-	T	R	-	-	-	B	Y					

** 2 parts construction*



Type P



Type W

CONCENTRIC & EXCENTRIC REDUCERS

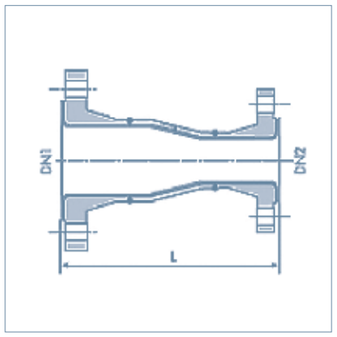
LINING

- **VIRGIN PTFE :** NB 1’’ – NB 24’’
- **ANTISTATIC PTFE, C4 = A :** NB 1’’ – NB 16’’

Standard construction :
- Type W : fixed flanges

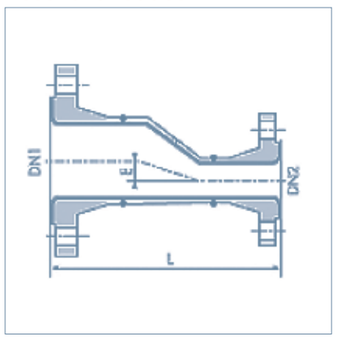
On request :
- Fixed flange / loose flange, C12 = 1

Concentric reducer



Type W

Eccentric reducer



Type W

NB1	NB2	L1 mm	E mm	Weight kg	REFERENCE														
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1’’	1/2’’	114	3.4	1.6	A	2	-	-	R	•	-	-	-	K	H					
	3/4’’	114	3.4	1.8	A	2	-	-	R	•	-	-	-	K	J					
1’’1/2	1/2’’	114	10	2.3	A	2	-	-	R	•	-	-	-	M	H					
	3/4’’	114	10	2.5	A	2	-	-	R	•	-	-	-	M	J					
	1’’	114	7.0	2.9	A	2	-	-	R	•	-	-	-	M	K					
2’’	3/4’’	127	4.6	3.5	A	2	-	-	R	•	-	-	-	N	J					
	1’’	127	13	3.9	A	2	-	-	R	•	-	-	-	N	K					
	1 1/2’’	127	5.7	4.6	A	2	-	-	R	•	-	-	-	N	M					
3’’	1 1/2’’	152	20	7.2	A	2	-	-	R	•	-	-	-	P	M					
	2’’	152	14	8.2	A	2	-	-	R	•	-	-	-	P	M					
4’’	1 1/2’’	178	32	9.5	A	2	-	-	R	•	-	-	-	Q	M					
	2’’	178	26	10.5	A	2	-	-	R	•	-	-	-	Q	N					
	3’’	178	13	13.1	A	2	-	-	R	•	-	-	-	Q	P					
6’’	3’’	229	40	17.6	A	2	-	-	R	•	-	-	-	S	P					
	4’’	229	26	19.9	A	2	-	-	R	•	-	-	-	S	Q					
8’’	4’’	279	52	28.5	A	2	-	-	R	•	-	-	-	T	Q					
	6’’	279	25	32.6	A	2	-	-	R	•	-	-	-	T	S					
10’’	4’’	305	76	35.7	A	2	-	-	R	•	-	-	-	U	Q					
	6’’	305	52	40.0	A	2	-	-	R	•	-	-	-	U	S					
	8’’	305	27	47.6	A	2	-	-	R	•	-	-	-	U	T					
12’’	6’’	356	75	53.1	A	2	-	-	R	•	-	-	-	V	S					
	8’’	356	51	61.2	A	2	-	-	R	•	-	-	-	V	T					
	10’’	356	26	67.7	A	2	-	-	R	•	-	-	-	V	U					
14’’	6’’	406	91	66.7	A	2	-	-	R	•	-	-	-	W	S					
	8’’	406	67	75.3	A	2	-	-	R	•	-	-	-	W	T					
	10’’	406	41	82.1	A	2	-	-	R	•	-	-	-	W	U					
	12’’	406	16	92.7	A	2	-	-	R	•	-	-	-	W	V					
16’’	8’’	457	92	90.4	A	2	-	-	R	•	-	-	-	X	T					
	10’’	457	66	97.5	A	2	-	-	R	•	-	-	-	X	U					
	12’’	457	41	108	A	2	-	-	R	•	-	-	-	X	V					
	14’’	457	25	120	A	2	-	-	R	•	-	-	-	X	W					
18’’	10’’	483	92	108	A	2	-	-	R	•	-	-	-	Y	U					
	12’’	483	66	118	A	2	-	-	R	•	-	-	-	Y	V					
	14’’	483	51	130	A	2	-	-	R	•	-	-	-	Y	W					
	16’’	483	25	142	A	2	-	-	R	•	-	-	-	Y	X					
20’’	12’’	508	91	139	A	2	-	-	R	•	-	-	-	Z	V					
	14’’	508	76	152	A	2	-	-	R	•	-	-	-	Z	W					
	16’’	508	51	163	A	2	-	-	R	•	-	-	-	Z	X					
	18’’	508	25	172	A	2	-	-	R	•	-	-	-	Z	Y					
24’’	20’’	610	51	226	A	2	-	-	R	•	-	-	-	B	Z					

• = C : Concentric Reducer • = E : Eccentric Reducer

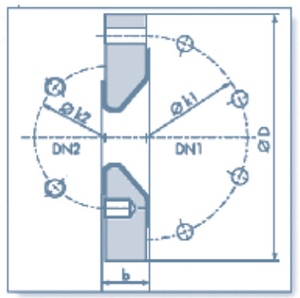
REDUCING FLANGES

LINING

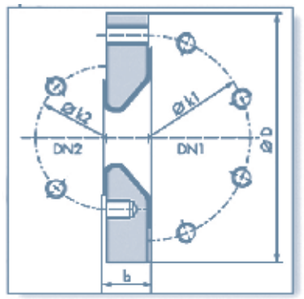
- **VIRGIN PTFE :** NB 3/4'' – NB 4''
- **ANTISTATIC PTFE, C4 = A :** NB 3/4'' – NB 4''

NB1	NB2	ØD mm	b mm	NB1				NB2			Type	Weight kg	REFERENCE														
				Ø k1 mm	Holes bolt			Ø k2 mm	Holes bolt				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					ks	Ø	UNC		nb	UNC																		
3/4''	1/2''*	98	35	69.8	4 x		1/2''	60.3	4 x	1/2''	C	1.9	A	2	-	-	B	R	-	-	-	J	H					
1''	1/2''*	108	35	79.4	4 x		1/2''	60.3	4 x	1/2''	C	2.1	A	2	-	-	B	R	-	-	-	K	H					
	3/4''*	108	35	79.4	4 x		1/2''	69.8	4 x	1/2''	C	2.0	A	2	-	-	B	R	-	-	-	K	J					
1'' 1/2	1/2''*	127	35	98.4	4 x		1/2''	60.3	4 x	1/2''	B	4.1	A	2	-	-	B	R	-	-	-	M	H					
	3/4''*	127	35	98.4	4 x		1/2''	69.8	4 x	1/2''	B	4.0	A	2	-	-	B	R	-	-	-	M	J					
	1''	127	35	98.4	4 x		1/2''	79.4	4 x	1/2''	B	3.9	A	2	-	-	B	R	-	-	-	M	K					
2''	1/2''	152	35	120.6	4 x		5/8''	60.3	4 x	1/2''	B	4.8	A	2	-	-	B	R	-	-	-	N	H					
	3/4''	152	35	120.6	4 x		5/8''	69.8	4 x	1/2''	B	4.8	A	2	-	-	B	R	-	-	-	N	J					
	1''	152	35	120.6	4 x		5/8''	79.4	4 x	1/2''	B	4.7	A	2	-	-	B	R	-	-	-	N	K					
	$1_{1/2}$''	152	35	120.6	4 x		5/8''	98.4	4 x	1/2''	C	4.5	A	2	-	-	B	R	-	-	-	N	M					
3''	1/2''	190	35	152.4	4 x	19	M16	60.3	4 x	1/2''	A	6.7	A	2	-	-	B	R	-	-	-	P	H					
	3/4''	190	35	152.4	4 x	19	M16	69.8	4 x	1/2''	A	6.6	A	2	-	-	B	R	-	-	-	P	J					
	1''	190	35	152.4	4 x		5/8''	79.4	4 x	1/2''	B	6.5	A	2	-	-	B	R	-	-	-	P	K					
	$1_{1/2}$''	190	35	152.4	4 x		5/8''	98.4	4 x	1/2''	B	6.2	A	2	-	-	B	R	-	-	-	P	M					
	2''	190	35	152.4	4 x		5/8''	120.6	4 x	5/8''	C	6.0	A	2	-	-	B	R	-	-	-	P	N					
4''	1/2''	229	45	190.5	8 x	19	M16	60.3	4 x	1/2''	A	11	A	2	-	-	B	R	-	-	-	Q	H					
	3/4''	229	45	190.5	8 x	19	M16	69.8	4 x	1/2''	A	20	A	2	-	-	B	R	-	-	-	Q	J					
	1''	229	45	190.5	8 x	19	M16	79.4	4 x	1/2''	A	11	A	2	-	-	B	R	-	-	-	Q	K					
	$1_{1/2}$''	229	45	190.5	8 x	19	M16	98.4	4 x	1/2''	A	11	A	2	-	-	B	R	-	-	-	Q	M					
	2''	229	45	190.5	8 x		5/8''	120.6	4 x	5/8''	B	10	A	2	-	-	B	R	-	-	-	Q	N					
	3''*	229	45	190.5	8 x		5/8''	152.4	4 x	5/8''	B	10	A	2	-	-	B	R	-	-	-	Q	P					

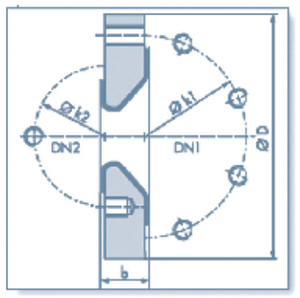
** Cylindrical bore*



Tapped hole / through hole type A



Tapped hole type B



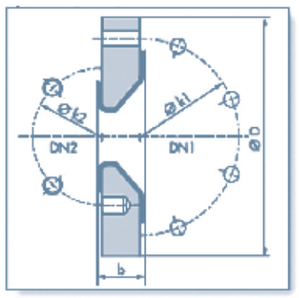
Tapped holes on center-line / off center-line type C

LINING

- **VIRGIN PTFE :** NB 6'' – NB 12''
- **ANTISTATIC PTFE, C4 = A :** NB 6'' – NB 12''

NB1	NB2	ØD mm	b mm	NB1				NB2			Type	Weight kg	REFERENCE														
				Ø k1 mm	Holes bolt			Ø k2 mm	Holes bolt				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					nb	Ø	UNC		nb	UNC																		
6''	1''	279	45	241.3	8 x	22		79.4	4 x	1/2''	A	17	A	2	-	-	B	R	-	-	-	S	K					
	$1_{1/2}$''	279	45	241.3	8 x	22		98.4	4 x	1/2''	A	17	A	2	-	-	B	R	-	-	-	S	M					
	2''	279	45	241.3	8 x	22		120.6	4 x	5/8''	A	17	A	2	-	-	B	R	-	-	-	S	N					
	3''	279	45	241.3	8 x		3/4''	152.4	4 x	5/8''	B	16	A	2	-	-	B	R	-	-	-	S	P					
	4''	279	45	241.3	8 x		3/4''	190.5	8 x	5/8''	C	15	A	2	-	-	B	R	-	-	-	S	Q					
8''	1''	343	45	298.4	8 x	22		79.4	4 x	1/2''	A	25	A	2	-	-	B	R	-	-	-	T	K					
	$1_{1/2}$''	343	45	298.4	8 x	22		98.4	4 x	1/2''	A	25	A	2	-	-	B	R	-	-	-	T	M					
	2''	343	45	298.4	8 x	22		120.6	4 x	5/8''	A	25	A	2	-	-	B	R	-	-	-	T	N					
	3''	343	45	298.4	8 x	22		152.4	4 x	5/8''	A	24	A	2	-	-	B	R	-	-	-	T	P					
	4''	343	45	298.4	8 x	22		190.5	8 x	5/8''	A	23	A	2	-	-	B	R	-	-	-	T	Q					
	6''	343	45	298.4	8 x		3/4''	241.3	8 x	3/4''	B	20	A	2	-	-	B	R	-	-	-	T	S					
10''	$1_{1/2}$''	406	45	362.0	12 x	25.5		98.4	4 x	1/2''	A	34	A	2	-	-	B	R	-	-	-	U	M					
	2''	406	45	362.0	12 x	25.5		120.6	4 x	1/2''	A	34	A	2	-	-	B	R	-	-	-	U	N					
	3''	406	45	362.0	12 x	25.5		152.4	4 x	1/2''	A	33	A	2	-	-	B	R	-	-	-	U	P					
	4''	406	45	362.0	12 x	25.5		190.5	8 x	5/8''	A	33	A	2	-	-	B	R	-	-	-	U	Q					
	6''	406	45	362.0	12 x	25.5		241.3	8 x	3/4''	A	30	A	2	-	-	B	R	-	-	-	U	S					
	*8''	406	45	362.0	12 x		7/8''	298.4	8 x	3/4''	B	27	A	2	-	-	B	R	-	-	-	U	T					
12''	2''	483	50	431.8	12 x	25.5		120.6	4 x	1/2''	A	55	A	2	-	-	B	R	-	-	-	V	N					
	3''	483	50	431.8	12 x	25.5		152.4	4 x	1/2''	A	54	A	2	-	-	B	R	-	-	-	V	P					
	4''	483	50	431.8	12 x	25.5		190.5	8 x	5/8''	A	54	A	2	-	-	B	R	-	-	-	V	Q					
	6''	483	50	431.8	12 x	25.5		241.3	8 x	3/4''	A	49	A	2	-	-	B	R	-	-	-	V	S					
	8''	483	50	431.8	12 x	25.5		298.4	8 x	3/4''	A	44	A	2	-	-	B	R	-	-	-	V	T					
	*10''	483	50	431.8	12 x		7/8''	361.9	12 x	7/8''	B	43	A	2	-	-	B	R	-	-	-	V	U					

** Cylindrical bore*



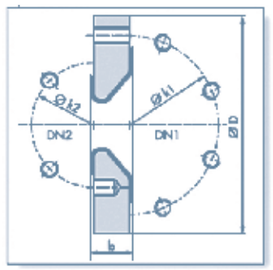
Tapped hole / through hole type A

REDUCING FLANGES

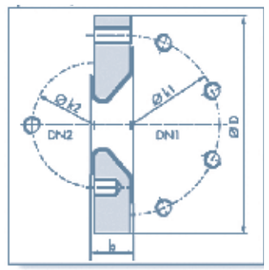
LINING

- **VIRGIN PTFE :** NB 14’’ – NB 24’’
- **ANTISTATIC PTFE, C4 = A :** NB 14’’ – NB 16’’

NB1	NB2	Ø D mm	b mm	NB1 Ø k1 mm	NB1 Holes bolt nb	NB1 Holes bolt Ø	NB1 Holes bolt UNC	NB2 Ø k2 mm	NB2 Holes bolt nb	NB2 Holes bolt UNC	Type	Weight kg	REFERENCE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14’’	6’’	534	50	476.2	12 x	28.6		241.3	8 x	3/4’’	A	60	A	2	-	-	B	R	-	-	-	W	S					
	8’’	534	50	476.2	12 x	28.6		298.4	8 x	3/4’’	A	56	A	2	-	-	B	R	-	-	-	W	T					
	10’’	534	50	476.2	12 x	28.6		361.9	12 x	7/8’’	A	53	A	2	-	-	B	R	-	-	-	W	U					
	12’’	534	50	476.2	12 x		1’’	431.8	12 x	7/8’’	B	50	A	2	-	-	B	R	-	-	-	W	V					
16’’	8’’	597	50	539.7	16 x	28.6		298.4	8 x	3/4’’	A	75	A	2	-	-	B	R	-	-	-	X	T					
	10’’	597	50	539.7	16 x	28.6		361.9	12 x	7/8’’	A	71	A	2	-	-	B	R	-	-	-	X	U					
	12’’	597	50	539.7	16 x	28.6		431.8	12 x	7/8’’	A	67	A	2	-	-	B	R	-	-	-	X	V					
	14’’	597	50	539.7	16 x		1’’	476.2	12 x	1’’	B	64	A	2	-	-	B	R	-	-	-	X	W					
18’’	10’’	635	50	577.8	16 x	31.7		361.9	12 x	7/8’’	A	78	A	2	-	-	B	R	-	-	-	Y	U					
	12’’	635	50	577.8	16 x	31.7		431.8	12 x	7/8’’	A	75	A	2	-	-	B	R	-	-	-	Y	V					
	14’’	635	50	577.8	16 x	31.7		476.2	12 x	1’’	A	73	A	2	-	-	B	R	-	-	-	Y	W					
	16’’	635	50	577.8	16 x		1 1/2’’	539.7	16 x	1’’	B	71	A	2	-	-	B	R	-	-	-	Y	X					
20’’	*6’’	698	50	635.0	20 x	31.7		241.3	8 x	7/8’’	A	124	A	2	-	-	B	R	-	-	-	Z	S					
	*8’’	698	50	635.0	20 x	31.7		298.4	8 x	7/8’’	A	114	A	2	-	-	B	R	-	-	-	Z	T					
	10’’	698	50	635.0	20 x	31.7		361.9	12 x	7/8’’	A	207	A	2	-	-	B	R	-	-	-	Z	U					
	12’’	698	50	635.0	20 x	31.7		431.8	12 x	7/8’’	A	98	A	2	-	-	B	R	-	-	-	Z	V					
	14’’	698	50	635.0	20 x	31.7		476.2	12 x	1’’	A	93	A	2	-	-	B	R	-	-	-	Z	W					
	16’’	698	50	635.0	20 x	31.7		539.7	16 x	1’’	A	88	A	2	-	-	B	R	-	-	-	Z	X					
	18’’	698	50	635.0	20 x		1 1/8’’	577.8	16 x	1’’	B	83	A	2	-	-	B	R	-	-	-	Z	Y					
24’’	18’’	813	50	749.3	20 x	35		577.8	16 x	1’’	A	80	A	2	-	-	B	R	-	-	-	B	Y					
	20’’	813	50	749.3	20 x	35		635.0	20 x	1’’	A	78	A	2	-	-	B	R	-	-	-	B	Z					



Tapped holes
type B

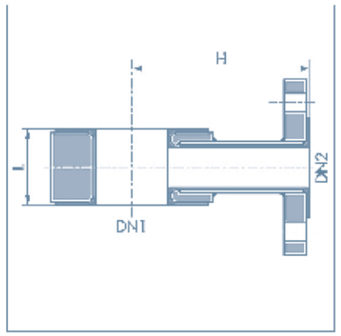


Tapped holes on center-line /
off center-line type C

INSTRUMENT TEES

LINING

- **VIRGIN PFA :**
  NB 1/2’’– NB 8’’
- **ANTISTATIC PFA,**
  C4 = A : NB 1/2’’– NB 8’’
- **VIRGIN PTFE :**
  NB 10’’– NB 24’’
- **ANTISTATIC PTFE,**
  C4 = A : NB 10’’– NB 16’’



Fixed flanges

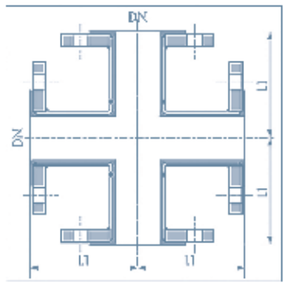
NB1	NB2	L mm	H mm	Weight kg	REFERENCE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1’’	1/2’’	50	89	1.9	A	2	-	-	P	I	-	-	-	K	H					
	3/4’’	50	89	1.9	A	2	-	-	P	I	-	-	-	K	J					
	1’’	50	89	2.0	A	2	-	-	P	I	-	-	-	K	K					
1’’ 1/2	1/2’’	50	102	2.7	A	2	-	-	P	I	-	-	-	M	H					
	3/4’’	50	102	2.8	A	2	-	-	P	I	-	-	-	M	J					
	1’’	50	102	3.0	A	2	-	-	P	I	-	-	-	M	K					
	1 1/2’’	75	102	4.6	A	2	-	-	P	I	-	-	-	M	M					
2’’	1/2’’	50	114	4.7	A	2	-	-	P	I	-	-	-	N	H					
	3/4’’	50	114	4.8	A	2	-	-	P	I	-	-	-	N	J					
	1’’	50	114	5.0	A	2	-	-	P	I	-	-	-	N	K					
	1 1/2’’	75	114	8.4	A	2	-	-	P	I	-	-	-	N	M					
	2’’	90	114	9.9	A	2	-	-	P	I	-	-	-	N	N					
3’’	1/2’’	50	140	5.7	A	2	-	-	P	I	-	-	-	P	H					
	3/4’’	50	140	5.8	A	2	-	-	P	I	-	-	-	P	J					
	1’’	50	140	6.0	A	2	-	-	P	I	-	-	-	P	K					
	1 1/2’’	75	140	11	A	2	-	-	P	I	-	-	-	P	M					
	2’’	90	140	12	A	2	-	-	P	I	-	-	-	P	N					
4’’	1/2’’	50	165	6.7	A	2	-	-	P	I	-	-	-	Q	H					
	3/4’’	50	165	6.8	A	2	-	-	P	I	-	-	-	Q	J					
	1’’	50	165	7.0	A	2	-	-	P	I	-	-	-	Q	K					
	1 1/2’’	75	165	12	A	2	-	-	P	I	-	-	-	Q	M					
6’’	1/2’’	50	203	8.9	A	2	-	-	P	I	-	-	-	S	H					
	3/4’’	50	203	9.0	A	2	-	-	P	I	-	-	-	S	J					
	1’’	50	203	10	A	2	-	-	P	I	-	-	-	S	K					
	1 1/2’’	75	203	15	A	2	-	-	P	I	-	-	-	S	M					
	2’’	90	203	16	A	2	-	-	P	I	-	-	-	S	N					
8’’	1/2’’	50	229	10	A	2	-	-	P	I	-	-	-	T	H					
	3/4’’	50	229	10	A	2	-	-	P	I	-	-	-	T	J					
	1’’	50	229	10	A	2	-	-	P	I	-	-	-	T	K					
	1 1/2’’	75	229	16	A	2	-	-	P	I	-	-	-	T	M					
	2’’	90	229	17	A	2	-	-	P	I	-	-	-	T	N					
10’’	1’’	50	279	24	A	2	-	-	P	I	-	-	-	U	K					
	1 1/2’’	75	279	26	A	2	-	-	P	I	-	-	-	U	M					
	2’’	90	279	27	A	2	-	-	P	I	-	-	-	U	N					
12’’	1’’	50	305	26	A	2	-	-	P	I	-	-	-	V	K					
	1 1/2’’	75	305	29	A	2	-	-	P	I	-	-	-	V	M					
	2’’	90	305	30	A	2	-	-	P	I	-	-	-	V	N					
14’’	1’’	50	356	41	A	2	-	-	P	I	-	-	-	W	K					
	1 1/2’’	75	356	44	A	2	-	-	P	I	-	-	-	W	M					
	2’’	90	356	45	A	2	-	-	P	I	-	-	-	W	N					
16’’	1’’	50	381	46	A	2	-	-	P	I	-	-	-	X	K					
	1 1/2’’	75	381	48	A	2	-	-	P	I	-	-	-	X	M					
	2’’	90	381	50	A	2	-	-	P	I	-	-	-	X	N					
18’’	1’’	50	419	51	A	2	-	-	P	I	-	-	-	Y	K					
	1 1/2’’	75	419	54	A	2	-	-	P	I	-	-	-	Y	M					
	2’’	90	419	55	A	2	-	-	P	I	-	-	-	Y	N					
*20’’	1’’	50	457	60	A	2	-	-	P	I	-	-	-	Z	K					
	1 1/2’’	75	457	63	A	2	-	-	P	I	-	-	-	Z	M					
	2’’	90	457	64	A	2	-	-	P	I	-	-	-	Z	N					
*24’’	1’’	100	559	69	A	2	-	-	P	I	-	-	-	B	K					
	1 1/2’’	150	559	72	A	2	-	-	P	I	-	-	-	B	M					
	2’’	150	559	73	A	2	-	-	P	I	-	-	-	B	N					

** 2 parts construction*

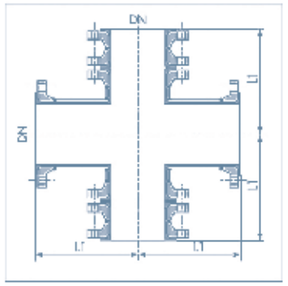
CROSSES

LINING

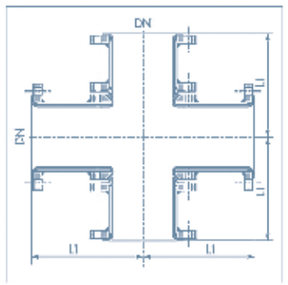
- **VIRGIN PFA :** NB 1/2" – NB 3"
- **ANTISTATIC PFA :** NB 1/2" – NB 3"
- **VIRGIN PTFE :** NB 4" – NB 24"
- **ANTISTATIC PTFE :** NB 4" – NB 16"



Fixed flanges type P



* Fixed flanges type W



** Fixed flanges type P

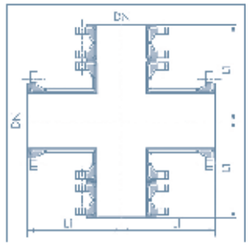
NB	L1 mm	Weight kg	REFERENCE															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2"	65	2.1	A	2	-	-	x	E	-	-	-	H						
3/4"	75	2.9	A	2	-	-	x	E	-	-	-	J						
1"	89	4.6	A	2	-	-	x	E	-	-	-	K						
1" 1/2	102	7.8	A	2	-	-	x	E	-	-	-	M						
2"	114	12.1	A	2	-	-	x	E	-	-	-	N						
3"	140	23.6	A	2	-	-	x	E	-	-	-	P						
4"	165	34.2	A	2	-	-	x	E	-	-	-	Q						
6"	203	53.9	A	2	-	-	x	E	-	-	-	S						
8"	229	88.2	A	2	-	-	x	E	-	-	-	T						
10"	279*	124	A	2	-	-	x	E	-	-	-	U						
12"	305*	169	A	2	-	-	x	E	-	-	-	V						
14"	356**	300	A	2	-	-	x	E	-	-	-	W						
16"	381**	371	A	2	-	-	x	E	-	-	-	X						
18"	419**	427	A	2	-	-	x	E	-	-	-	Y						
20"	457**	547	A	2	-	-	x	E	-	-	-	Z						
24"	559**	712	A	2	-	-	x	E	-	-	-	B						

** Assembly only possible using 4 bolts ** In 2 parts*

Standard construction :
- Type P : NB 1/2" to NB 3" and NB 18" to NB 24"
- Type W : NB 4" to NB 16"

On request :
- 4 loose flanges : C12 = 4

REDUCING CROSSES



Fixed flanges type P

LINING

- **VIRGIN PFA :** NB 3/4" – NB 3"
- **ANTISTATIC PFA, C4 = A :** NB 3/4" – NB 3"
- **VIRGIN PTFE :** NB 4" – NB 24"
- **ANTISTATIC PTFE, C4 = A :** NB 4" – NB 16"

Standard construction :
- Type P : Fixed flanges

On request :
- 4 loose flanges : C12 = 4

NB1	NB2	L1 mm	Weight kg	REFERENCE														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/4"	1/2"	75	2.0	A	2	-	-	x	R	-	-	-	J	H					
1"	1/2"	89	2.9	A	2	-	-	x	R	-	-	-	K	H					
	3/4"	89	3.1	A	2	-	-	x	R	-	-	-	K	J					
1" 1/2	1/2"	102	4.6	A	2	-	-	x	R	-	-	-	M	H					
	3/4"	102	4.8	A	2	-	-	x	R	-	-	-	M	J					
	1"	102	5.2	A	2	-	-	x	R	-	-	-	M	K					
2"	1/2"	114	6.8	A	2	-	-	x	R	-	-	-	N	H					
	3/4"	114	7.0	A	2	-	-	x	R	-	-	-	N	J					
	1"	114	7.4	A	2	-	-	x	R	-	-	-	N	K					
	1 1/2"	114	8.2	A	2	-	-	x	R	-	-	-	N	M					
3"	1"	140	13.5	A	2	-	-	X	R	-	-	-	P	K					
	1 1/2"	140	14.3	A	2	-	-	X	R	-	-	-	P	M					
	2"	140	15.4	A	2	-	-	X	R	-	-	-	P	N					
4"	1"	165	19.3	A	2	-	-	X	R	-	-	-	Q	K					
	1 1/2"	165	20.2	A	2	-	-	X	R	-	-	-	Q	M					
	2"	165	21.2	A	2	-	-	X	R	-	-	-	Q	N					
	3"	165	23.9	A	2	-	-	X	R	-	-	-	Q	P					
6"	1"	203	30.8	A	2	-	-	X	R	-	-	-	S	K					
	1 1/2"	203	31.7	A	2	-	-	X	R	-	-	-	S	M					
	2"	203	32.8	A	2	-	-	X	R	-	-	-	S	N					
	3"	203	35.6	A	2	-	-	X	R	-	-	-	S	P					
	4"	203	37.9	A	2	-	-	X	R	-	-	-	S	Q					
8"	1"	229	50.7	A	2	-	-	X	R	-	-	-	T	K					
	1 1/2"	229	51.6	A	2	-	-	X	R	-	-	-	T	M					
	2"	229	52.7	A	2	-	-	X	R	-	-	-	T	N					
	3"	229	55.5	A	2	-	-	X	R	-	-	-	T	P					
	4"	229	57.8	A	2	-	-	X	R	-	-	-	T	Q					
	6"	229	61.7	A	2	-	-	X	R	-	-	-	T	S					

NB1	NB2	L1 mm	Weight kg	REFERENCE														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10"	4"	279	78.8	A	2	-	-	X	R	-	-	-	U	Q					
	6"	279*	83.0	A	2	-	-	X	R	-	-	-	U	S					
	8"	279*	90.6	A	2	-	-	X	R	-	-	-	U	T					
12"	4"	305*	104	A	2	-	-	X	R	-	-	-	V	Q					
	6"	305*	108	A	2	-	-	X	R	-	-	-	V	S					
	8"	305*	115	A	2	-	-	X	R	-	-	-	V	T					
	10"	305*	122	A	2	-	-	X	R	-	-	-	V	U					
14"	4"	356*	145	A	2	-	-	X	R	-	-	-	W	Q					
	6"	356*	152	A	2	-	-	X	R	-	-	-	W	S					
	8"	356*	165	A	2	-	-	X	R	-	-	-	W	T					
	10"	356*	176	A	2	-	-	X	R	-	-	-	W	U					
	12"	356*	197	A	2	-	-	X	R	-	-	-	W	V					
16"	4"	381	177	A	2	-	-	X	R	-	-	-	X	Q					
	6"	381	183	A	2	-	-	X	R	-	-	-	X	S					
	8"	381	196	A	2	-	-	X	R	-	-	-	X	T					
	10"	381	207	A	2	-	-	X	R	-	-	-	X	U					
	12"	381	228	A	2	-	-	X	R	-	-	-	X	V					
	14"	381	246	A	2	-	-	X	R	-	-	-	X	W					
18"	8"	419	225	A	2	-	-	X	R	-	-	-	Y	T					
	10"	419	236	A	2	-	-	X	R	-	-	-	Y	U					
	12"	419	257	A	2	-	-	X	R	-	-	-	Y	V					
	14"	419	276	A	2	-	-	X	R	-	-	-	Y	W					
20"	8"	457	281	A	2	-	-	X	R	-	-	-	Z	T					
	10"	457	292	A	2	-	-	X	R	-	-	-	Z	U					
	12"	457	313	A	2	-	-	X	R	-	-	-	Z	V					
	14"	457	332	A	2	-	-	X	R	-	-	-	Z	W					
	16"	457	352	A	2	-	-	X	R	-	-	-	Z	X					
	18"	457	364	A	2	-	-	X	R	-	-	-	Z	Y					
24"	10"	559	380	A	2	-	-	X	R	-	-	-	B	U					
	12"	559	401	A	2	-	-	X	R	-	-	-	B	V					
	14"	559	421	A	2	-	-	X	R	-	-	-	B	W					
	16"	559	441	A	2	-	-	X	R	-	-	-	B	X					
	18"	559	455	A	2	-	-	X	R	-	-	-	B	Y					
	20"	559	487	A	2	-	-	X	R	-	-	-	B	Z					

** 3 parts construction*

SPACERS

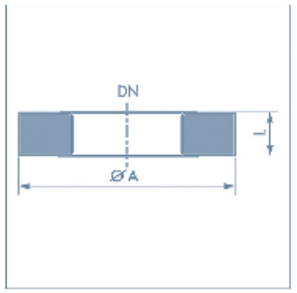
LINING

- **VIRGIN PTFE :** DN 15 – DN 600NB 1/2’’ – NB 24’’
- **ANTISTATIC PTFE, C4 = A :** NB 1/2’’ – NB 16’’

NB	ØA	F (mm)	G (mm)		H (mm)		REFERENCE													
	mm	L	L min.	L max.	L min.	L max.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2”	42.0	20	15	50	50	90	A	2	-	-	•	-	x	x	x	H						
3/4”	52.0	20	15	50	50	90	A	2	-	-	•	-	x	x	x	J						
1”	66.5	20	15	50	50	90	A	2	-	-	•	-	x	x	x	K						
1” 1/2	85.5	20	15	60	60	110	A	2	-	-	•	-	x	x	x	M						
2”	105	20	15	60	60	120	A	2	-	-	•	-	x	x	x	N						
3”	136	20	15	60	60	140	A	2	-	-	•	-	x	x	x	P						
4”	174	20	15	60	60	150	A	2	-	-	•	-	x	x	x	Q						
6”	222	20	15	60	60	160	A	2	-	-	•	-	x	x	x	S						
8”	279	20	20	70	60	180	A	2	-	-	•	-	x	x	x	T						
10”	339	20	20	70	60	210	A	2	-	-	•	-	x	x	x	U						
12”	409	20	20	70	60	230	A	2	-	-	•	-	x	x	x	V						
14”	451	20	20	70	70	230	A	2	-	-	•	-	x	x	x	W						
16”	510	20	20	80	70	260	A	2	-	-	•	-	x	x	x	X						
18”	549	20	20	80	70	270	A	2	-	-	•	-	x	x	x	Y						
20”	590	20	20	80	70	280	A	2	-	-	•	-	x	x	x	Z						
24”	717	20	20	80	80	300	A	2	-	-	•	-	x	x	x	B						

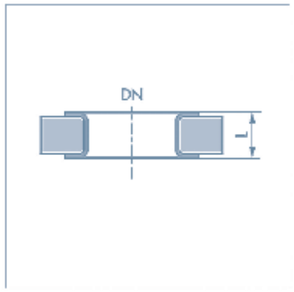
• = F : Spacers shape F • = G : Spacers shape G • = E : Spacers shape H xxxx : length in mm

Massive PTFE spacer



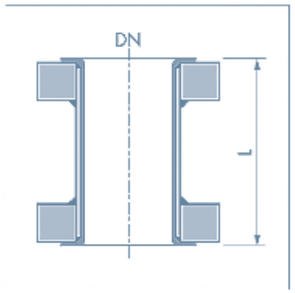
Shape F

Steel lined spacer



Shape G

Tube lined spacer



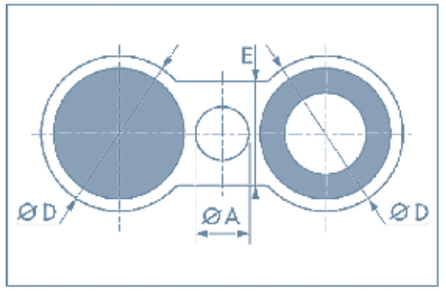
Shape H

SPECTACLE BLINDS

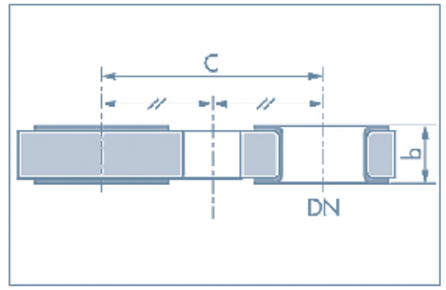
LINING

- **VIRGIN PTFE :** NB 1/2’’ – NB 24’’
- **ANTISTATIC PTFE, C4 = A :** NB 1/2’’ – NB 16’’

NB	ØD	C	E	ØA	b	Weight	REFERENCE													
	mm	mm	mm	mm	mm	kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2”	44	60	35	16	14	0.2	A	2	-	-	O	B	-	-	-	H						
3/4”	53	70	35	16	14	0.2	A	2	-	-	O	B	-	-	-	J						
1”	63	78	35	16	14	0.3	A	2	-	-	O	B	-	-	-	K						
1”1/2	82	98	50	19	14	0.4	A	2	-	-	O	B	-	-	-	M						
2”	101	121	50	19	14	0.6	A	2	-	-	O	B	-	-	-	N						
3”	133	152	60	19	14	0.9	A	2	-	-	O	B	-	-	-	P						
4”	171	191	50	22	18	1.6	A	2	-	-	O	B	-	-	-	Q						
6”	219	241	60	22	18	3.7	A	2	-	-	O	B	-	-	-	S						
8”	276	298	70	26	21	5.6	A	2	-	-	O	B	-	-	-	T						
10”	336	362	65	26	21	10.7	A	2	-	-	O	B	-	-	-	U						
12”	406	432	70	29	23	15.5	A	2	-	-	O	B	-	-	-	V						
14”	441	476	70	29	26	27.2	A	2	-	-	O	B	-	-	-	W						
16”	505	540	70	29	28	34.8	A	2	-	-	O	B	-	-	-	X						
18”	540	578	70	32	28	49.9	A	2	-	-	O	B	-	-	-	Y						
20”	597	635	65	32	33	55.1	A	2	-	-	O	B	-	-	-	Z						
24”	708	750	70	35	39	73.7	A	2	-	-	O	B	-	-	-	B						



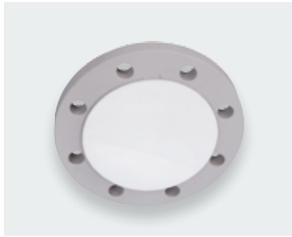
Spectacle blind (front view)



Spectacle blind (sectional view)

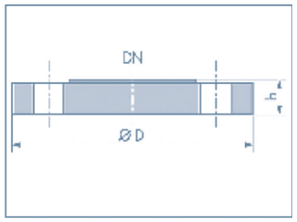
BLIND FLANGES & LATERAL TEES

BLIND FLANGES



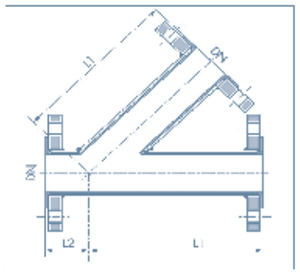
LINING

- **VIRGIN PTFE :** NB 1/2'' – NB 24''
- **PTFE ANTISTATIC, C4 = A :** NB 1/2'' – NB 16''



NB	ØD	b	Weight	REFERENCE															
	mm	mm	kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2''	89	14	0.3	A	2	-	-	B	P	-	-	-	H						
3/4''	98	16	0.5	A	2	-	-	B	P	-	-	-	J						
1''	108	17	0.9	A	2	-	-	B	P	-	-	-	K						
1''1/2	127	18	1.3	A	2	-	-	B	P	-	-	-	M						
2''	152	22	2.4	A	2	-	-	B	P	-	-	-	N						
3''	190	27	4.9	A	2	-	-	B	P	-	-	-	P						
4''	229	27	6.9	A	2	-	-	B	P	-	-	-	Q						
6''	279	28	11	A	2	-	-	B	P	-	-	-	S						
8''	343	32	19	A	2	-	-	B	P	-	-	-	T						
10''	406	34	28	A	2	-	-	B	P	-	-	-	U						
12''	482	36	45	A	2	-	-	B	P	-	-	-	V						
14''	533	39	58	A	2	-	-	B	P	-	-	-	W						
16''	597	40	76	A	2	-	-	B	P	-	-	-	X						
18''	635	44	92	A	2	-	-	B	P	-	-	-	Y						
20''	698	47	119	A	2	-	-	B	P	-	-	-	Z						
24''	813	52	181	A	2	-	-	B	P	-	-	-	B						

LATERAL TEES



Lateral tees type P

DN	L1	L2	Weight	REFERENCE															
	mm	mm	kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1''	146	44	3.7	A	2	-	-	T	L	-	-	-	K						
1''1/2	178	51	6.5	A	2	-	-	T	L	-	-	-	M						
2''	203	64	10	A	2	-	-	T	L	-	-	-	N						
3''	254	76	21	A	2	-	-	T	L	-	-	-	P						
4''	305	76	31	A	2	-	-	T	L	-	-	-	Q						
6''	368	89	52	A	2	-	-	T	L	-	-	-	S						
8''	445	114	91	A	2	-	-	T	L	-	-	-	T						

LINING

- **VIRGIN PFA :** NB 1'' – NB 4''
- **ANTISTATIC PFA, C4 = A :** NB 1'' – NB 4''
- **VIRGIN PTFE :** NB 6'' to NB 8''
- **ANTISTATIC PTFE, C4 = A :** DNB 6'' to NB 8''

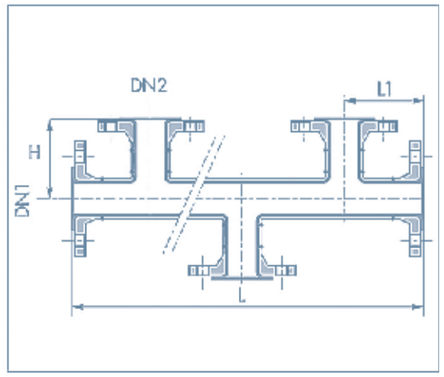
MANIFOLDS

LINING

- **VIRGIN PTFE :** NB 1'' – NB 12''
- **ANTISTATIC PTFE :** NB 1'' – NB 12''

DRAWING ABOVE IS SHOWN AS AN EXEMPLE

Other manifolds configurations on request : number, DN and nozzles inclination
L maxi : 1,5 meter



Fixed flanges manifolds type W

NB1	NB2	H	L1
		mm	mm
1''	1''	89	89
1'' 1/2	1''	102	102
	$1_{1/2}$''	102	102
2''	1''	114	114
	2''	114	114
	3''	114	114
3''	1''	140	140
	$1_{1/2}$''	140	140
	2''	140	140
	3''	140	140
4''	1''	165	165
	$1_{1/2}$''	165	165
	2''	165	165
	3''	165	165
	4''	165	165
6''	1''	203	203
	$1_{1/2}$''	203	203
	2''	203	203
	3''	203	203
	4''	203	203
	6''	203	203
8''	$1_{1/2}$''	229	229
	2''	229	229
	3''	229	229
	4''	229	229
	6''	229	229
	8''	229	229
10''	$1_{1/2}$''	279	279
	2''	279	279
	3''	279	279
	4''	279	279
	6''	279	279
	8''	279	279
	10''	279	279
12''	3''	305	305
	4''	305	305
	6''	305	305
	8''	305	305
	10''	305	305
	12''	305	305

ANSI 300 LBS FLANGES & SPOOLS

LINING

- **VIRGIN PTFE :** B 3/4" - NB 20"
- **ANTISTATIC PTFE, C4 = A :** NB 3/4" - NB 16"

NB	FLANGES											SPOOLS		
	D	dx	dy	dz	k	b1	b2	b3	holes		bolting	L	weight	weight
	mm	mm	mm	mm	mm	mm	mm	mm	nb	ø	UNC	min	kg / meter	kg / pair flanges
1/2"	95	31.8	36	42	66.7	14.3	12.7	12	4	16	1/2	100	2.1	1.7
3/4"	117	39.7	42	52	82.5	15.9	14.3	14	4	19	5/8	110	2.1	2.7
1"	124	47.6	51	60	88.9	17.5	15.9	14	4	19	5/8	115	2.5	3.3
1" 1/2	156	68.3	72	73	114.3	20.6	19.6	14	4	23	3/4	120	5.0	5.9
2"	165	87.3	90	92	127.0	22.2	20.6	16	8	19	5/8	140	6.7	7.0
3"	210	117.5	125	127	168.3	28.6	27.0	18	8	23	3/4	170	13.7	13.8
4"	254	150.8	155	157	200.0	31.7	30.1	20	8	23	3/4	200	19.2	21.5
6"	318	203.2	210	216	269.9	36.5	34.9	22	12	23	3/4	210	34.1	35.3
8"	381	255.6	262	270	330.2	41.3	39.7	26	12	26	7/8	230	52.9	52.9
10"	445	311.2	320	324	387.3	47.6	46.0	30	16	29	1	250	63.9	77.4
12"	520	365.1	370	381	450.8	50.8	49.2	34	16	32	11/8	280	65.5	110.0
14"	585	393.7	416	413	514.3	54.0	52.4	36	20	32	11/8	280	85.3	150.0
16"	650	450.9		470	571.5	57.1	55.5	42	20	35	11/4	300	97.9	191.0
18"	710	514.4		533	628.6	60.3	58.7	46	24	35	11/4	330	110.0	232.0
20"	775	565.2		584	685.8	63.5	61.9	50	24	35	11/4	350	132.0	280.0
24"	915	666.8		692	812.8	69.8	68.2	54	24	42	11/2	400	161.0	406.0

ANSI 300 LBS FITTINGS

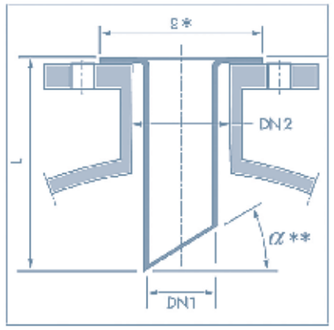
NB	90° Elbow		45° Elbow		Tee		Reducer		Inst. Tee	
	L (mm)	w (kg)	L (mm)	w (kg)	L (mm)	w (kg)	L (mm)	w (kg)	L (mm)	H (mm)
1/2"	102	3.5	57	3.3	102	5.3	114	3	50	102
1"	114	6.6	70	6.1	114	10.2	114	4.8	50	114
2"	127	7.9	76	7.2	127	12.2	127	6.9	50	127
3"	151	16.2	89	14	152	25.2	152	11.3	50	152
4"	178	25.7	114	23	178	39.8	178	19.6	50	178
6"	216	44.8	140	39.1	216	69.4	229	32.9	50	216
8"	254	71	151	60.4	254	110	279	53.7	50	254
10"	292	103	178	87.9	292	158	305	79.4	50	292
12"	330	138	203	121	330	211	356	112	50	330
14"	381	195	216	169	381	370	107	155	50	381
16"	419	247	241	215	419	469	457	205	50	419
18"	**700	342	298	281	457	568	482	252	50	457
20"	**810	971	*343	615	495	700	508	306	50	495
24"	**974	1384	*412	877	571	987	610	413	*100	571

For fittings, ANSI 300 lbs linings are not identical to 150 lbs parts and standard construction.

Please pay attention for instrument tees, L is given for a 1" nozzle.

** 2 parts construction*
*** 3 parts construction*

ENTRY PIPES



Type A

LINING

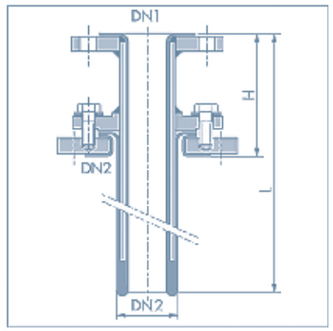
- **VIRGIN PTFE :** B 3/4" - NB 20"
- **ANTISTATIC PTFE, C4 = A :** NB 3/4" - NB 16"

NB1	NB2	L max. mm	REFERENCE														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3/4"	1"	3000	A	2	-	-	N	x	x	x	x	J						
1"	1 1/2"	3000	A	2	-	-	N	x	x	x	x	K						
1" 1/2	2"	3000	A	2	-	-	N	x	x	x	x	M						
2"	3"	3000	A	2	-	-	N	x	x	x	x	N						
3"	4"	3000	A	2	-	-	N	x	x	x	x	P						
4"	5"	3000	A	2	-	-	N	x	x	x	x	Q						
6"	8"	3000	A	2	-	-	N	x	x	x	x	S						
8"	10"	3000	A	2	-	-	N	x	x	x	x	T						
10"	12"	3000	A	2	-	-	N	x	x	x	x	U						
12"	14"	3000	A	2	-	-	N	x	x	x	x	V						
14"	16"	3000	A	2	-	-	N	x	x	x	x	W						
16"	18"	2000	A	2	-	-	N	x	x	x	x	X						
18"	20"	2000	A	2	-	-	N	x	x	x	x	Y						
20"	24"	1500	A	2	-	-	N	x	x	x	x	Z						

** Collar G diameter in accordance with DN2 ** α : different angles possible on requested*

xxxx : length in mm

DIP PIPES



Type B

NB1	NB2 min.	H mm	L max. mm
1/2"	1 1/2"	140	3000
3/4"	1 1/2"	140	3000
1"	2"	160	3000
1" 1/2	3"	170	3000
2"	3"	180	3000
3"	4"	190	3000
4"	6"	200	3000
6"	8"	200	3000

LINING

- **VIRGIN PTFE :** NB 1/2" - NB 6"
- **ANTISTATIC PTFE, C4 = A :** NB 1/2" - NB 6"

Other special dip pipes are available on request.

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