

ARMYLOR

PTFE / PFA LINED PIPING AND FITTINGS ANSI B16.5

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We made it

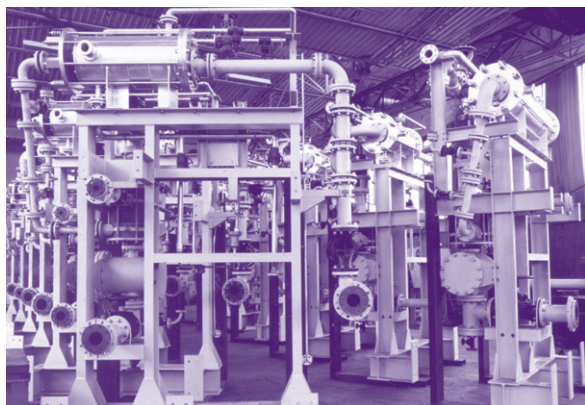
CARBONE LORRAINE IS NOW

MERSEN

■■■ MANUFACTURER OF PTFE/PFA LINED PIPING

Since 1964, the CARBONE LORRAINE group has been a pioneer in the transport and storage of corrosive fluids. Experience combined with ongoing improvement of processes and materials have allowed CARBONE LORRAINE to offer ARMYLOR®, the largest range of lined piping in the world.

ARMYLOR® is a PTFE/PFA lined steel piping system with exceptional anti-corrosion features. The performance of these products is a result of mastering the process of high performance fluorocarbon resins.

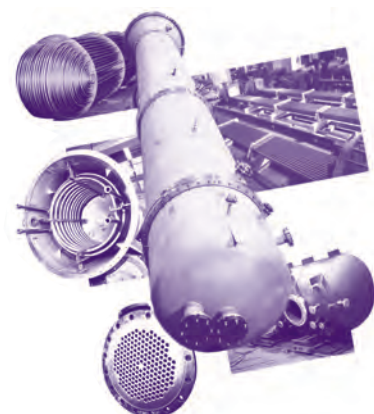


ARMYLOR® is the ideal solution for transport and fluids treatment in extreme conditions.



■■■ CARBONE LORRAINE, THE WORLD SPECIALIST OF ANTI-CORROSION MATERIALS, ALSO SUPPLIES:

- Graphite equipment: GRAPHILOR®, exchangers, columns, rupture discs, etc.
- Reactive metal equipment: exchangers, tanks, etc.



■■■ QUALITY SYSTEM

Our Pagny-sur-Moselle facility is ISO 9001 certified for quality insurance and ISO 14001 for environmental aspects.

■■■ MANUFACTURING PROCESSES

CARBONE LORRAINE excels in various processing technics like past extrusion, isostatic molding and transfer molding.

■■■ SERVICE

To allow quick delivery, CARBONE LORRAINE has its own welding shop and has a large stock of finished products available.

Most of CARBONE LORRAINE subsidiaries offer fittings ex-stock and are equipped to manufacture straight lengths.

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ACCORDING TO ANSI B16.5

PTFE/PFA LINED STEEL

ARMYLOR®, a CARBONE LORRAINE registered trademark, is a complete range of PTFE/PFA lined accessories.

The ARMYLOR® products have been specially developed for the transport, treatment or storage of corrosive fluids at high temperatures (piping, columns and reactors, bellows and armored expansion joint).

The ARMYLOR® range can also be supplied according to DIN 2848 standard.

The nominal diameters (DN) range from NB 1/2" to NB 24" for fittings and piping elements and above 2 m for columns.

There are 3 types of ARMYLOR® products:

- ARMYLOR® G: standard range
- ARMYLOR® V: vacuum and pressure range
- ARMYLOR® S: special range

The ARMYLOR® products are manufactured in accordance with the PED 97.23 EC European Directive and can be supplied with a stainless steel or low-temperature steel shell.

ARMYLOR® limit temperatures are in accordance with DESP 97.23 EC European Directive (-40°C/+250°C).

Special pieces of specific or non standard sizes can be manufactured on request.



1 DEFINITION

The available lining materials for the range are the following:

- >> Virgin or anti static PTFE (polytetrafluorethylene), in according to the ASTM D489 & 4895 standards.
- >> Virgin or anti static PFA (perfluoroalkoxy), according to ASTM D 3307 standards.

2 GENERAL CHARACTERISTICS

Values indicated in the following table correspond to virgin material.

These characteristics can vary according to the materials supplied, the transformation processes and their components.

PROPERTIES	Units	PTFE	PFA
Physical			
Specific weight	g/cm ³	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 method"		50 - 72	60 - 65
Thermal			
Flame propagation		hard	hard
Melting point	°C	327 et 342	300 à 310
Other transitions	°C	-90*, +123*, +27**	-80*, 90*
Maximum service temperature	°C	-200/+260	-150/+260
Temperature of deflection under load (1.82Mpa)	°C	50 - 60	50
Linear elongation coefficient	10 ⁻⁵ / °C	10 - 25	12
Thermal conductivity	Ω / m.K	0.24	0.25
Electrical			
Dielectric constant from 60 Hz to 10 ⁷ Hz		2.2	2.1
Volume resistivity	Ω.cm	10 ¹⁸	10 ¹⁸
Surface resistivity	Ω	10 ¹⁷	10 ¹⁷
Dielectric strength (ép. mm)	KV / mm	36(1)	80(2.3)

*amorphous phase, **crystal phase

3 CHARACTERISTICS CONTROLLED AT RECEPTION

The material certificates of powder manufacturers are checked prior to acceptance of batches.

1 NOMINAL THICKNESSES

CARBONE LORRAINE proposes 3 ranges of ARMYLOR® products: ARMYLOR® G and ARMYLOR® V whose thicknesses are indicated in the table below.

ARMYLOR® S has special thickness for specific temperature, vacuum resistance and/or applications.

■ ■ ■ PTFE/PFA THICKNESS

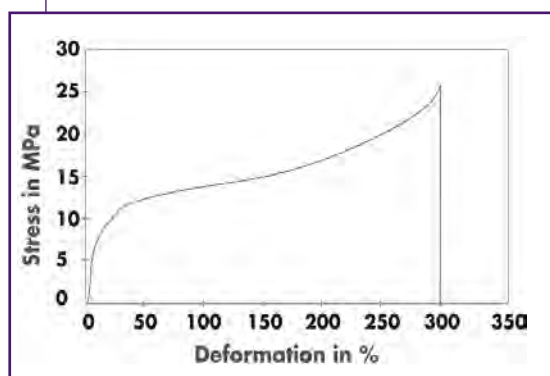
DN	Straight Lengths		Elbows		Tees		Conc. / Exc. Red		Instrument tees		Manifolds	
	G	V	G	V	G	V	G	V	G	V	G	V
1/2"	1.8	3.0		3.0		3.0		3.0		3.0		3.0
3/4"	2.0	3.0		3.0		3.0		3.0		3.0		4.0
1"	2.0	3.0		3.3		3.0		3.5		3.0		4.0
1 1/2"	2.5	3.0		4.0		3.5		3.5		3.5		6.0
2"	2.5	3.0		4.0		3.5		3.5		3.5		7.0
3"	3.0	3.5	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	12.0	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 minimum thickness of the PTFE lining is equal to the nominal thickness minus 10%.
Minimum thickness of the flare is equal to the nominal thickness minus 20%.

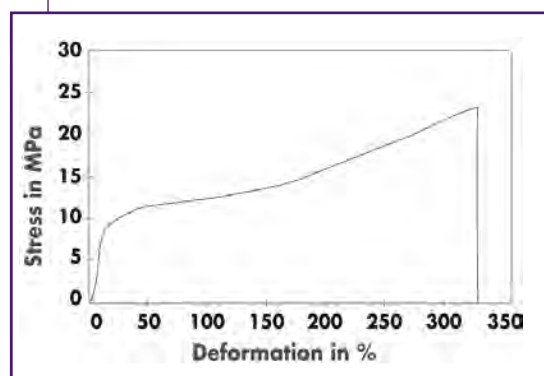
2 CHARACTERISTICS CONTROLLED DURING MANUFACTURE

On each batch manufactured, CARBONE LORRAINE checks that the mechanical, physical and electrical properties comply with the table page 6.

Parallel direction



Perpendicular direction



The elongation at break and tensile strength values obtained, together with the shape of the graphs opposite, provides confirmation that the liner sintering has re-established the isotropic form of the PTFE, which guarantees a low level of permeability.

Optimum density ensures a compromise between a low permeability level and a good deformation capacities during temperature cycles.

For thermoplastics, Melt Flow Index (MFI) conformity ensures molecular chain integrity and excellent "stress crack" resistance.

	MECHANICAL PROPERTIES		PHYSICAL PROPERTIES		
	Tensile strength	Elongation at break	Density		MFI
PTFE Extruded					
Virgin	$\pm 21 \text{ N/mm}^2$ (Sens //) $\pm 17 \text{ N/mm}^2$ (Sens \perp)	$\pm 250\%$ (Sens //) $\pm 200\%$ (Sens \perp)	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749	
Test according standard	ASTM D4895	ASTM D4895			
ANTI STATIC	$\pm 21 \text{ N/mm}^2$ (Sens //) $\pm 17 \text{ N/mm}^2$ (Sens \perp)	$\pm 250\%$ (Sens //) $\pm 200\%$ (Sens \perp)	2.13 - 2.19 ASTM D792	2.12 - 2.18 DIN 53749	
Test according standard	ASTM D4895	ASTM D4895			
PTFE Molding					
Virgin	$\pm 21 \text{ N/mm}^2$ ASTM D4894	$\pm 250\%$ ASTM D4894	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749	
Test according standard	ASTM D4894	ASTM D4894			
ANTI STATIC	$\pm 21 \text{ N/mm}^2$ ASTM D4894	$\pm 250\%$ ASTM D4894	2.14 - 2.19 ASTM D792	2.12 - 2.18 DIN 53749	
Test according standard	ASTM D4894	ASTM D4894			
PFA					
Virgin	$\pm 26 \text{ N/mm}^2$ ASTM D3307	$\pm 300\%$ ASTM D3307	2.12 - 2.17 ASTM D792	2.12 - 2.17 DIN 53749	1-3 g/10 mn ASTM D3307
Test according standard	ASTM D3307	ASTM D3307			
ANTI STATIC	$\pm 26 \text{ N/mm}^2$ ASTM D3307	$\pm 300\%$ ASTM D3307	2.11 - 2.17 ASTM D792	2.11 - 2.16 DIN 53749	0.5-1.5 g/10 mn ASTM D3307
Test according standard	ASTM D3307	ASTM D3307			

The results comply with the ASTM F1545 standard.

3 ANTI STATIC PTFE/PFA ELECTRICAL PROPERTIES

Transverse resistivity: $< 10^7$ ohm based on the BS 2050 standard

Surface resistivity: $< 10^8$ ohm based on the BS 2782-230A standard

Volume resistivity: $< 10^8$ ohm.cm based on the BS 2782-231A standard

In addition to the properties described above, liners are subject to visual inspections:



1 PERMEABILITY

Numerous tests have enabled CARBONE LORRAINE to become an expert in the field of permeation.

Several factors have an influence on the phenomenon :

■ ■ ■ **The thickness of the lining** is the most significant factor. The curve below shows the sharp decrease in permeability level according to thickness.

■ ■ ■ **The size of the molecules.** The helium permeability curve shows the ability of a very small molecule such as helium to pass through the PTFE/PFA.

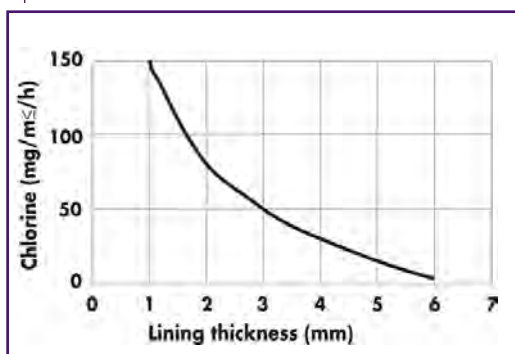
■ ■ ■ **The chemical nature of the product:** any chemical similarity between the material passing through and the material passed through increases permeability.

■ ■ ■ **Temperature and pressure:** permeation increases with temperature and pressure.

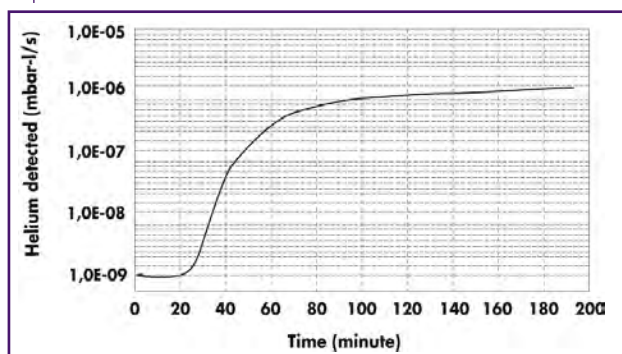
■ ■ ■ The extrusion and isostatic moulding have similar level of permeability.

■ ■ ■ Examples of permeability curves:

PTFE/PFA permeability curve



Helium permeability PTFE/PFA curve



2 CREEP ON PTFE

Creep is the deformation of a material over time under the influence of an applied stress.

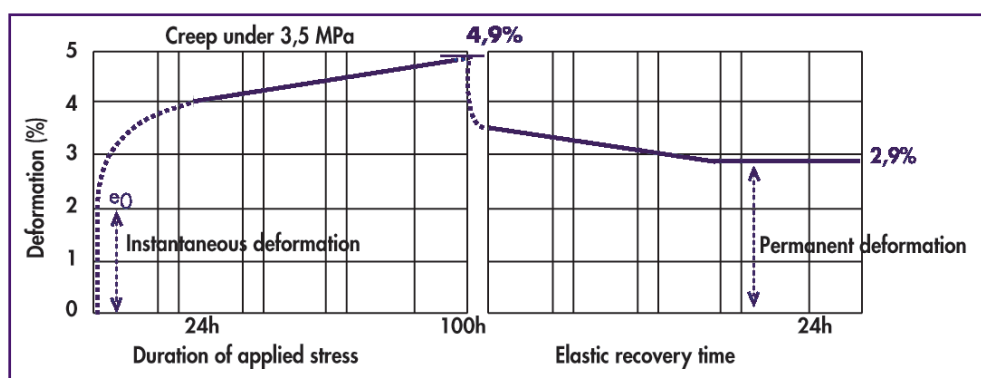
The effect of temperature increases deformation.

In the case shown below, a PTFE sample was placed under a fixed load at a constant temperature. This load leads to the appearance of instantaneous deformation (ϵ_0).

The material continues to deform slowly over the course of time (up to 4.9% on the graph).

Removal at the load after 100 hours triggers instantaneous elastic recovery. Deformation then continues to decline, tending towards a plateau that is not zero (permanent deformation at 2.9% in this case).

This residual deformation warrants a periodic check on tightening torques.



1 COMPONENTS

The table below shows the various steel or iron components used for the manufacture of our standard pieces. Certificates 3.1b in accordance with EN 10204 are available on demand.

Steel in conformity with the DIN or JIS standards, low temperature or stainless steel can be supplied on request. [Contact us for more information.](#)

DESCRIPTION	PIPE / BODIES		FLANGE / COLLAR	
	STANDARD DIMENSIONAL	GRADE	STANDARD DIMENSIONAL	GRADE
Straight lengths	ANSI B36.10	ASTM 106 Gr B	ANSI B16.5	ASTM A 105
Elbows Welded construction	ANSI B16.9 /ANSI B16.28	ASTM A 234 WPB	ANSI B16.5	ASTM A 105
Elbows Cast steel	ANSI B16.5	ASTM A 216 WCB	ANSI B16.5 (*)	ASTM A 216 WCB
Elbows Ductile iron	ANSI B16.5	ASTM A 369 (60 40 18)	ANSI B16.5 (*)	ASTM A 216 WCB
Tee Welded construction	ANSI B36.10 /ANSI B16.9	ASTM A 106 Gr B ASTM A 234 WPB	ANSI B16.5	ASTM A 105
Tee Cast steel	ANSI B16.5	ASTM A 216 WCB	ANSI B16.5 (*)	ASTM A 216 WCB
Concentric & Eccentric reducer	ANSI B16.9	ASTM A 234 WPB	ANSI B16.5	ASTM A 105
Reducing flange			ANSI B16.5 (*)	ASTM A 516 Gr 60 / P 235 GH-En-10028-
Spacers	ANSI B36.10	ASTM A 106 Gr B	ANSI B16.5 (*)	ASTM A 516 Gr 60 / P 235 GH-En-10028-
Instrument tee Welded construction	CL technical brochure	ASTM A 106 Gr B	ANSI B16.5	ASTM A 105 / ASTM A 516 Gr 60 / P 235 GH-En-10028-
Instrument tee Cast steel	CL technical brochure	ASTM A 216 WCB	ANSI B16.5 (*)	ASTM A 216 WCB

* bolt pattern drilling

2 WELDING

CARBONE LORRAINE is qualified in accordance with the European standards EN 15613 - EN 15614 (for welding procedure) and EN 287.1 (for welders) qualification regarding the A.A.G., M.I.G. & T.I.G., A.D.M. HP 5.1 and ASME IX processes.

These approvals are regularly renewed, either internally or by an external independent body. Audits are carried out in order to ensure that suppliers meet the same requirements. CARBONE LORRAINE is also HPO, SQLO and ASME Stamp 'U' certified.

3 LARGED STUB END

Regarding straight lengths, CARBONE LORRAINE proposes a backing flange obtained by cold forming at the tube extremity, from NB 1/2" to NB 14". This process complies with PED and has been approved by T.Ü.V. and APAVE. A loose flange stop can be supplied on request.

4 SPHEROIDAL GRAPHITE DUCTILE IRON (S.G) and cast steel

CARBONE LORRAINE uses S.G. iron according to the EN 1563 standard and cast steel according to A316 WCB.

5 VENT HOLES

PTFE and PFA lined piping is supplied with vent holes in order to :

- ■ ■ **Prevent** any back pressure between the metallic housing and the lining.
- ■ ■ **Detect** any possible leaks during pressure tests.
- ■ ■ Quickly **detect** any sign of corrosion.

Straight lengths below 500 mm have one 3 mm diameter vent hole in the middle of the piece.

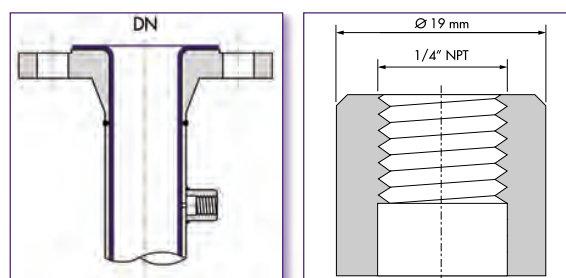
Those above 500 mm have two vent holes located about 150 mm from each end.

The fittings have at least one 3 mm diameter vent hole. Reducing flanges, blind flanges and spacers do not have vent hole.

In the case of particular specifications or thermal insulation, couplings can be welded to the vent holes.

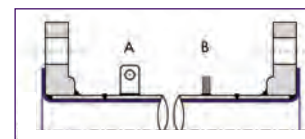
6 VENT BOSSES

If the vent holes must be identified quickly or when the line is insulated, a coupling can be welded at the vent holes levels. In the case of different insulation thicknesses, an extension to achieve the size required can be fitted on to the coupling.



7 ELECTRICAL CONTINUITY

The electrical continuity of lined piping can be ensured by connecting the individual elements together by means of conductors linked to earth. For fittings and straight lengths below 500 mm, these are welded in the middle of the piece and at about 150 mm from the back side of each flange in the case of straight lengths above 500 mm. CARBONE LORRAINE supplies two types of earth lugs. The standard earths lugs are in stainless steel 304 or 316.



A : Support leg
B : M6 or M8
threaded bolt

8 PAINTING

The standard coating is a primary 40 micron thick zinc silicate primer coating on shot blasted steel, to cleanliness level Sa 2.5.

Other surface preparations, undercoats or topcoats can be applied on request.

9 CHARACTERISTICS CONTROLLED DURING MANUFACTURE

The dimensional inspection is systematically completed by the following additional checks:

- ■ ■ **Perpendicularity** and positioning of flanges
- ■ ■ **Thickness** of the painting
- ■ ■ **Absence of any protruding element** inside the parts that might damage the lining.

CARBONE LORRAINE offers certain optional non-destructive test :

- ■ ■ **X-ray** of the welding.
- ■ ■ **Liquid** dye penetrant test performed by COFREND II qualified personnel.

1 DIMENSIONAL TOLERANCES

Dimensions of lined pieces
are indicated in pages 17 to 37.

All the lined pieces are subject to the following tolerances:

5% for PTFE/PFA flare.

	Tolerance	Dimensional tolerance	Angular tolerance
Straight 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°
Fittings	DN 25-100	+0 ; -3 mm	±0.5°
	DN 125-200	+0 ; -4 mm	±0.5°
	DN 250-600	+0 ; -5 mm	±0.5°

2 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												
ARMYLOR® V	Vacuum 2 Torr 230° C						Vacuum 2 Torr 150° C						
ARMYLOR® S							Vacuum according to particular specifications						

Unit conversion : 760 Torrs = 760 mmHg = 1 bar = 1 kg/cm² = 10⁵ Pa = 14.5 Psi

3 TEMPERATURE CYCLE TESTS

The pieces tested undergo 100 alternate steam/cold water cycles, according to the ASTM F1545 standard. The steam is absorbed by the lining under the influence of both the temperature level and the pressure. The lining is subject to significant stresses due to the sudden drop in pressure combined with rapid cooling. This test is a qualitative process test.

4 CHARACTERISTICS CONTROLLED DURING MANUFACTURE

In addition to the numerous internal checks carried out throughout the entire manufacturing process (acceptance of powders, physical properties of the lining, etc.) piping is subject to the following inspections:

■ 4-1 ■ Dimensional and visual test

The overall dimensions of the straight lengths, the size of the collars, the lining thickness of moulded pieces and the absence of surface defects are checked once the pieces have been produced.

■ 4-2 ■ Electrostatic test

Piping element undergoes the electrostatic check in the following conditions:

■ ■ ■ PTFE/PFA: test voltage potential: 5.000*E volts (*E* = thickness of lining in mm) with a maximum of 15.000 volts.

■ 4-3 ■ Hydrostatic test

This test is carried out on pieces with vent holes, injected or produced from extruded pipes.

The standard test pressure is 1.5 times the operational pressure. This test can also be carried out in other conditions (pressure, length of time, number of cycles) on request.

■ 4-4 ■ Pneumatic test

A hot pneumatic test is carried out on isomolding parts and on certain parts manufactured from extruded liners.

5 TRACEABILITY AND MARKING



■ 5-1 ■ TRACEABILITY

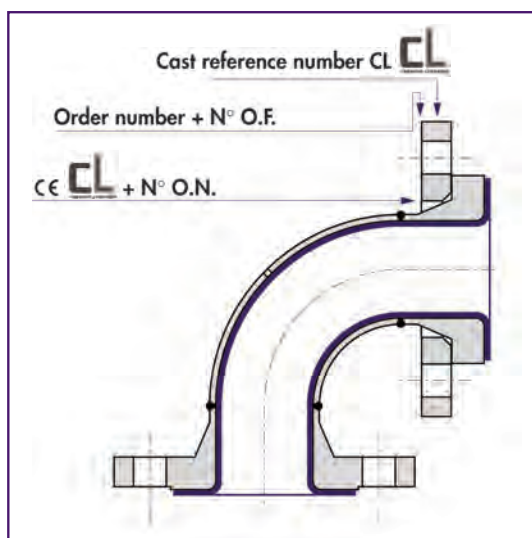
In addition to markings relative to hydrostatic and electrostatic tests, traceability, an essential part of the Quality assurance system, is achieved as follows:

■■■ **Steel:** The heat reference number is cold stamped on each steel or ductile iron piece.

CARBONE LORRAINE has been approved by the TÜV to report the heat number on cut steel pipes.

■■■ **Finished product:** the following information is stamped on finished piece:

- >> the CARBONE LORRAINE,  the order number and the part number (O.F. number)
- >> the  + O.N. (notified body)



■■■ **Documentary traceability:** total traceability is ensured regarding both metallic components and lining materials.

■ 5-2 ■ MARKING

Diameter, piece type for fittings or length for straight lengths are marked on the wooden tape.

Additional markings can be done on request.

6 PACKAGING

Straight lengths are packed on floor-mounted loads or in wooden crates.

Fittings are packed in wooden crates or in cardboard boxes on pallets.



The ARMYLOR® lined piping and fittings are safety products that have been manufactured according to specific standards. The following recommendations will allow an optimum use of our products.

1 PRECAUTIONS

The lined steel elements are delivered with wooden tapes to protect the flare. Only remove these protective tapes at the time of assembly, and put them back after any inspection or whenever the part is removed from the plant. Once the ends have been removed, the greatest care is required to not damaged the lining.

2 CLEANING

Flared surface must be carefully cleaned prior to assembly.

3 BOLT TIGHTENING

The assembly of PTFE/PFA lined piping elements does not require the use of gaskets except when materials of different natures are being coupled or during successive assembly 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 right table.
 - ■ ■ **Tightening** "opposites" as with any flange connection.
- Tightening torque values given are for PTFE/PFA and may vary depending on greasing, the condition of the threaded hole, etc.
- Values are given for ANSI 150 lbs flanges.
- They are indicated for cold conditions and must always be checked in cold condition, after 24 hours of installation; they should also be checked periodically.

The tightening torque values indicated apply to:

- ■ ■ **Class 8.8 steel nuts** (resistant to 800N/mm rupture, elasticity limit of 640N/mm).
- ■ ■ 0.12. screw/nut friction **coefficient**.

NB Inch	Bolts UNC	Torque N.m
1/2"	4x1/2"	20
3/4"	4x1/2"	20
1"	4x1/2"	30
1 1/2"	4x1/2"	30
2"	4x5/8"	60
3"	4x5/8"	60
4"	8x5/8"	60
6"	8x3/4"	110
8"	8x3/4"	110
10"	12x7/8"	160
12"	12x7/8"	180
14"	12x1"	200
16"	16x1"	190
18"	16x1 1/8"	370
20"	20x1 1/8"	370
24"	20x1 1/4"	530

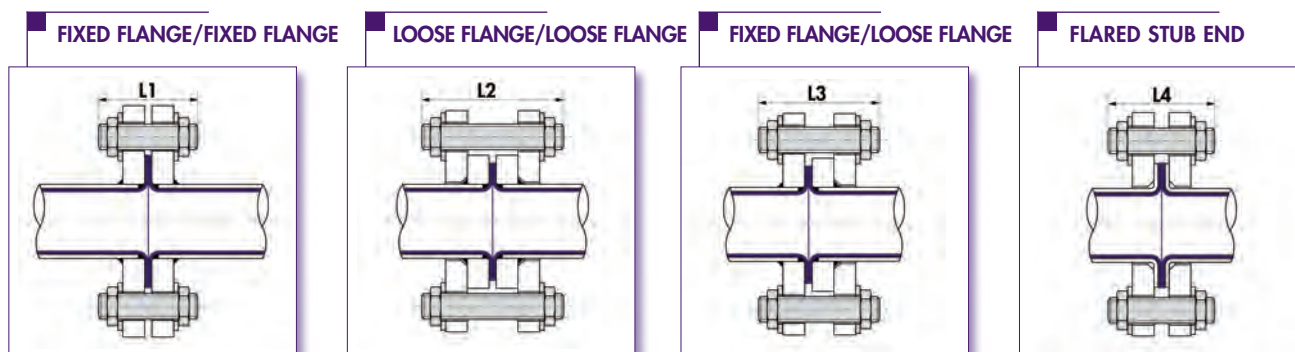


4 BOLT LENGTHS

The table below sets out the recommended screwed rod lengths for the various assemblies.

The dimensions indicated refer to :

- ■ ■ **A coupling** equal to $\frac{1}{3}$ the diameter of the screwed rod.
- ■ ■ **A nut height** equal to the diameter of the screwed rod.



5 VENT HOLES

Vent holes must not be obstructed by insulation or painting. For insulated lines, vent extensions should be provided.

When pipes are put into service for the first time, air or water trapped inside at the time of assembly may escape through the vent holes. It is recommended that, when undertaking periodic inspections of the installation, a check is made that no leak has occurred at the site of the vent holes. This also act as corrosion indicators.

6 FIELD FLARING KIT

To facilitate on site assembly, **CARBONE LORRAINE** has developed a field flaring kit which allows spools to be cut to length on site. **CARBONE LORRAINE** supplies special PTFE-liner/steel tube lengths for this purpose.

ASA 150					
DN	L1	L2	L3	L4	
	mm	mm	mm	mm	
DN 1/2"	70	90	80	75	
DN 3/4"	75	100	85	75	
DN 1"	75	100	90	80	
DN 1 1/2"	85	110	95	85	
DN 2"	95	120	110	100	
DN 3"	105	135	120	110	
DN 4"	105	140	120	115	
DN 6"	120	155	135	130	
DN 8"	125	165	145	135	
DN 10"	135	180	160	150	
DN 12"	140	190	165	155	
DN 14"	155	205	180	170	
DN 16"	160	210	185		
DN 18"	175	225	200		
DN 20"	180	230	205		
DN 24"	190	240	215		

ASA 300					
DN	L1	L2	L3	L4	
	mm	mm	mm	mm	
DN 1/2"	75	100	90	80	
DN 3/4"	90	115	100	90	
DN 1"	90	120	105	95	
DN 1 1/2"	100	125	110	105	
DN 2"	100	130	115	105	
DN 3"	125	160	140	130	
DN 4"	130	170	150	140	
DN 6"	140	185	165	150	
DN 8"	155	210	180	170	
DN 10"	180	240	210	195	
DN 12"	195	265	230	210	
DN 14"	200	275	240	215	
DN 16"	215	300	260		
DN 18"	225	315	270		
DN 20"	230	330	280		
DN 24"	260	370	315		

7 WEIGHT

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

8 SUPPORTS

Elements must be supported using rings that are independent of the lined pipe. **No welding should be performed on lined elements.** However, supporting elements may be welded prior to lining.

ARMYLOR® RANGE

REFERENCES

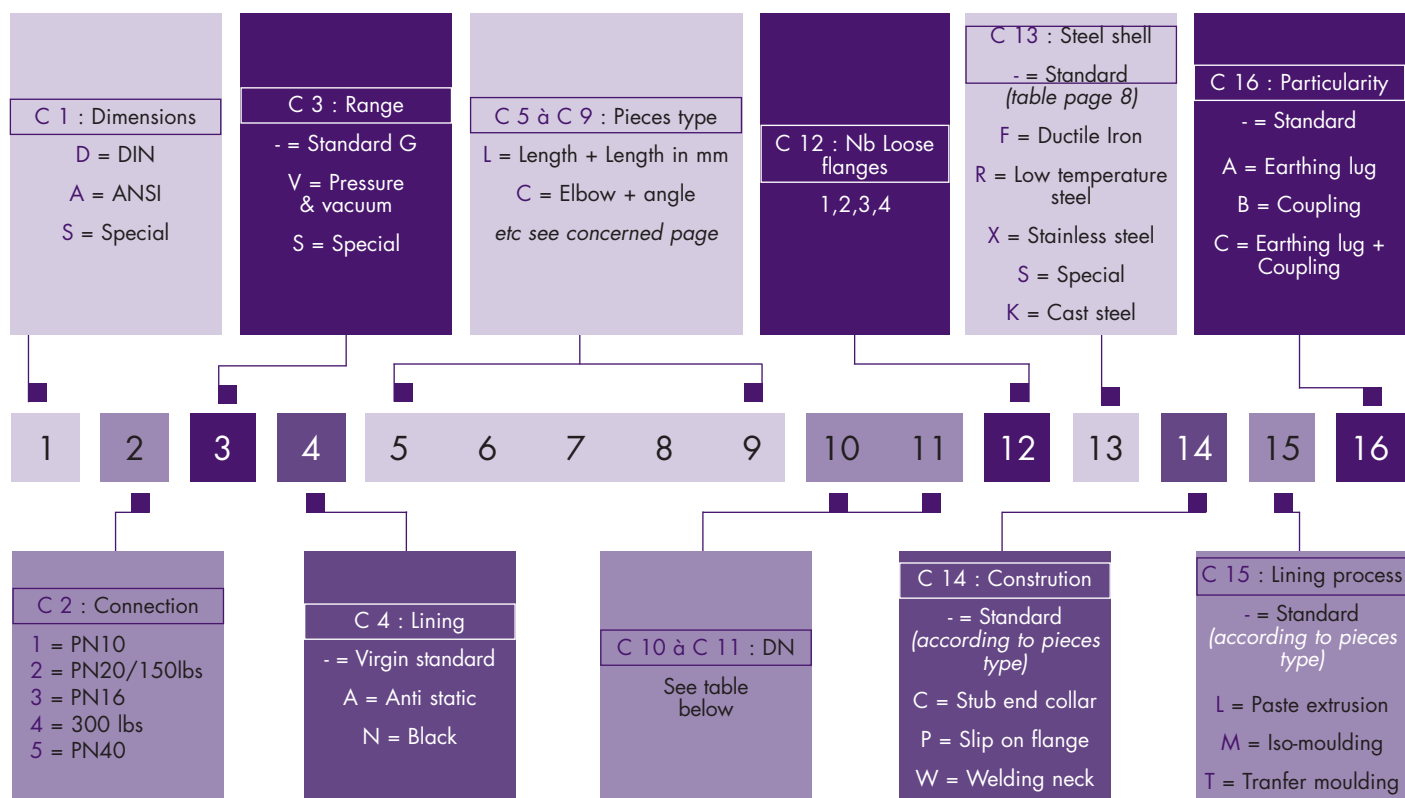
15

■ ANSI FLANGES AND TUBES	16
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Each ARMYLOR® element has a reference, which allow its definition:

This reference includes 16 alphanumeric characters. The characters 1 to 10 must be informed, the others allow to define some eventual particularity.

The indicated references in the dimensional tables are the ones of the standard construction.



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"		


Example :

A2-V-L1234T-XW-A ANSI 150 lbs, vacuum range, 1234 mm straight length, NB 8", stainless steel, welding neck, earthing lug.

A2-C45-P-1 : ANSI 150 lbs, 45° elbow, NB 2"-1LF

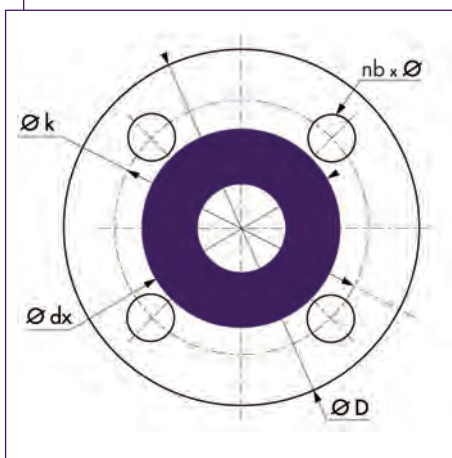
A2-TE---N ANSI 150 lbs, equal tee, NB 2"

A2-RC---QP ANSI 150 lbs, NB 4"X3" concentric reduced

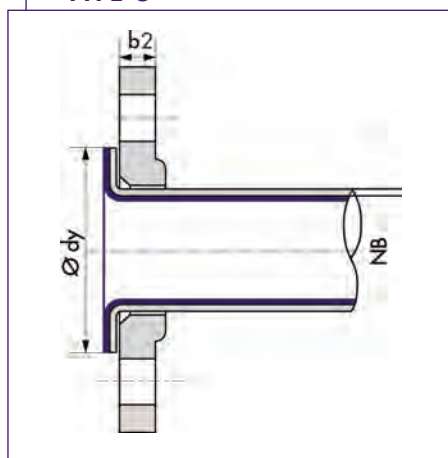
NB	D	dx mini*	dy	dz	k	b1	b2	b3	holes			Steel tubes	
									nbr	Ø		UNC	d1
1/2"	89	31	36	42	60.3	11.1	9.5	10	4	16	1/2	26.7	2.9
3/4"	99	39	42	52	69.0	12.7	11.1	12	4	16	1/2	26.7	2.9
1"	108	47	51	60	79.4	14.3	12.7	12	4	16	1/2	33.4	3.4
1 1/2"	127	68	72	73	98.4	17.5	15.9	12	4	16	1/2	48.3	3.7
2"	152	87	90	92	120.6	19.0	17.4	14	4	20	5/8	60.3	3.9
3"	191	117	125	127	152.4	23.8	22.2	16	4	20	5/8	88.9	5.5
4"	229	150	155	157	190.5	23.8	22.2	16	8	20	5/8	114.3	6.0
6"	279	203	210	216	241.3	25.4	23.8	18	8	23	3/4	168.3	7.1
8"	343	255	262	270	298.4	28.6	27.0	20	8	23	3/4	219.1	8.2
10"	406	311	320	324	361.9	30.2	28.6	22	12	26	7/8	273.0	7.8
12"	493	365	370	381	431.8	32.7	31.1	24	12	26	7/8	323.8	8.4
14"	535	393	413	413	476.2	34.9	33.3	25	12	29	1	355.6	7.9
16"	597	450		470	539.7	36.5	34.9	25	16	29	1	406.4	7.9
18"	635	514		533	577.8	39.7	38.1	25	16	32	1 1/8	457.2	7.9
20"	699	565		584	635.0	42.9	41.3	25	20	32	1 1/8	508.0	9.5
24"	813	666		692	749.3	47.6	46.0	25	20	35	1 1/4	609.8	9.5

* According to ASTM F1545

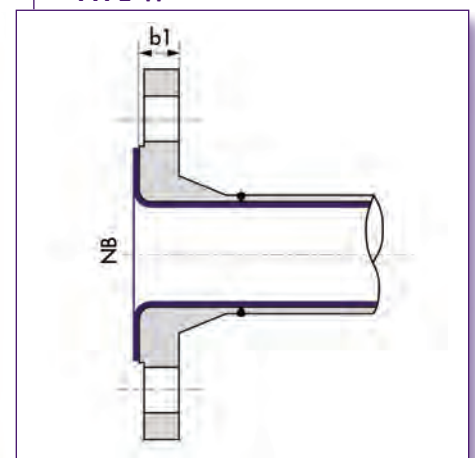
FLANGE (front view)



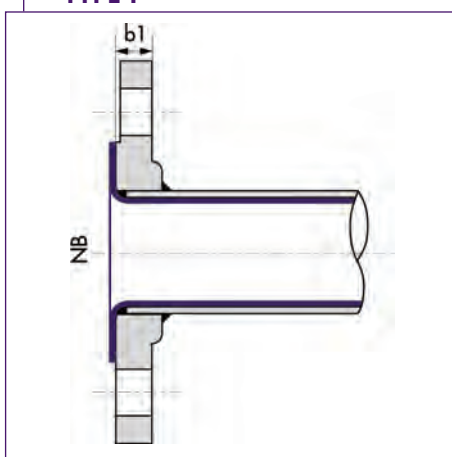
FLARED STUB END TYPE C



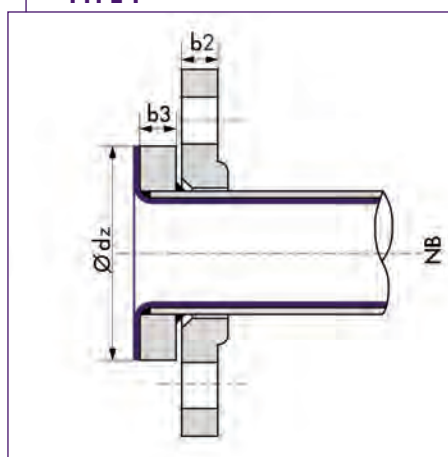
WELDING NECK TYPE W



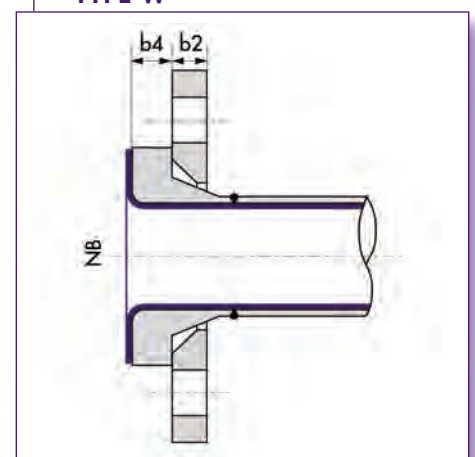
SLIP-ON TYPE P



COLLAR + SLIP ON TYPE P



COLLAR + SLIP ON TYPE W



NB	L min mm	L max. mm	Weight (Kg) metre	Pair flanges weight	Référence															
					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	3000	85	76.1	A 2	-	-	L	x	x	x	x	W							
16"	150	3000	98	95.2	A 2	-	-	L	x	x	x	x	X							
18"	150	3000	110	108	A 2	-	-	L	x	x	x	x	Y							
20"	160	3000	132	136	A 2	-	-	L	x	x	x	x	Z							
24"	180	3000	161	172	A 2	-	-	L	x	x	x	x	B							

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

LINING

> VIRGIN PTFE:

NB 1/2" to NB 24"

> ANTISTATIC PTFE:

NB 1/2" to NB 16": C4 = A

Range and thickness Page 5

Calculation of a straight length's weight:

Ex : NB 1", length 6 meters

$6 \times (\text{weight per meter}) + \text{Flange pair weight} = 6 \times 2 + 2,1 = 17,1 \text{ kg}$

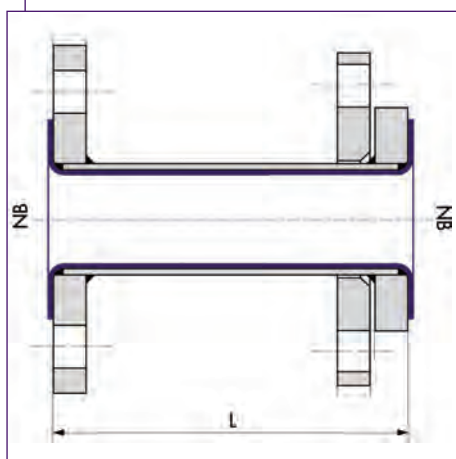
Standard construction : Type C: up to NB 14"

Type P: superior standard to NB 14"

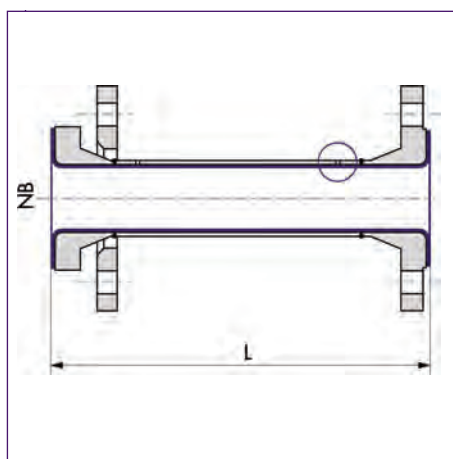
On request : Type W: C14 = W

Type P: NB 1/2" to NB 14" : C14 = P

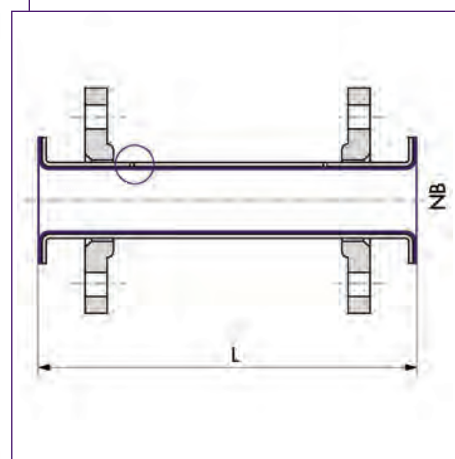
FIXED FLANGE/LOOSE FLANGE TYPE P CONSTRUCTION



FIXED FLANGE/LOOSE FLANGE TYPE W CONSTRUCTION



LOOSE FLANGE TYPE C CONSTRUCTION



NB	L (mm)	L (mm)	L (mm)	L (mm)	Weight (Kg)				Référence															
	$\alpha=90^\circ$	$\alpha=45^\circ$	$\alpha=60^\circ$	$\alpha=30^\circ$	90°	45°	60°	30°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	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"	■ 475	216			179	138			A 2	-	-	C	?	?	x	x	Y							
20"	■ 810**	■ 343*			538	341			A 2	-	-	C	?	?	x	x	Z							
24"	■ 974**	■ 412*			693	439			A 2	-	-	C	?	?	x	x	B							

▲ Ductile iron part available * 2 parts construction ** 3 parts construction

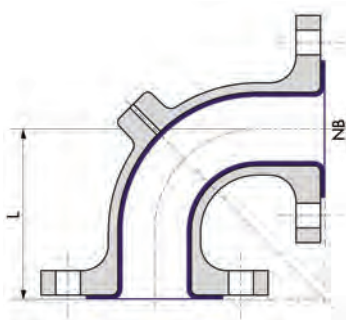
■ Does not conform to ANSI NB 16.5 standard ?? Angle in degree: 30, 45, 60 or 90 or standard

LININGS

> **PTFE:** NB 1/2" to NB 24"
> **ANTISTATIC PTFE:** NB 1/2" to NB 16": C4 = A

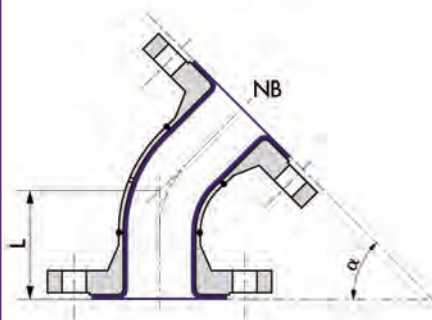
Range and thickness Page 5

DUCTILE IRON ELBOW

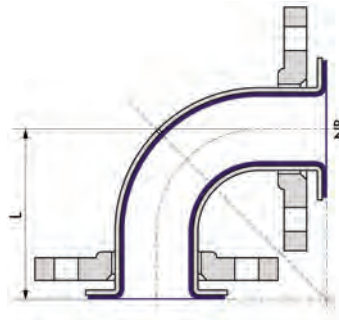


STANDARD FIXED FLANGES ELBOW

$\alpha = 90^\circ/60^\circ/45^\circ/30^\circ$



FLARED STUB END ELBOW



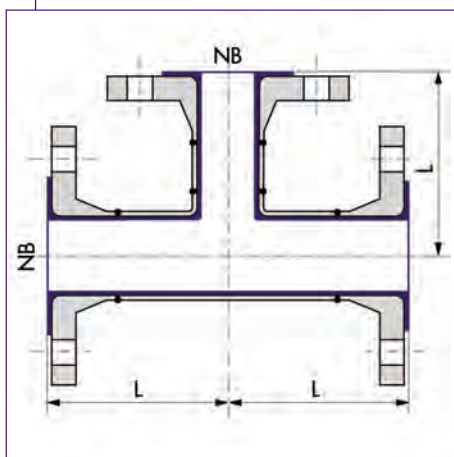
The 30° et 60° elbows proposed by Carbone Lorraine are not included in the ANSI NB 16.5 standard

Standard construction: Type P: NB 1/2" to NB 2"
Type W: superior NB

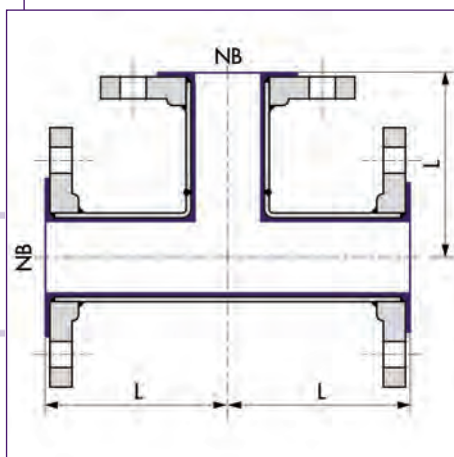
On request:

- 1 fixed flange + 1 loose flange: C12 = 1
- 2 loose flanges: C12 = 2
- ductile iron elbow: C13 = F

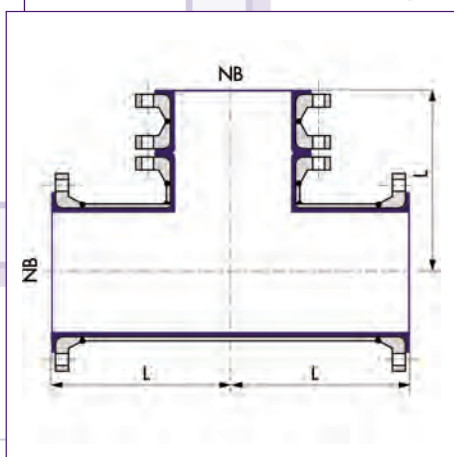
FIXED FLANGES TEE TYPE W



FIXED FLANGES TEE TYPE P



* ISO FIXED FLANGES TYPE W



NB	L	Weight	Référence															
	mm	Kg	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						

▲ Ductile iron parts available

LININGS

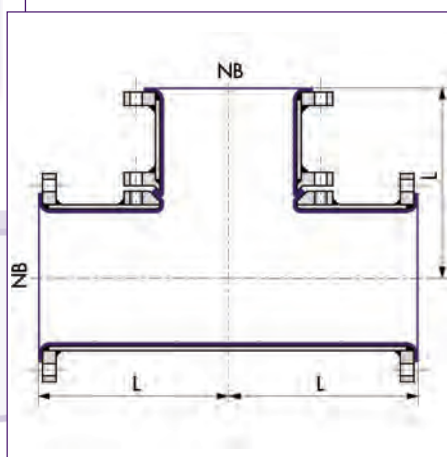
- > **PFA:** NB 1/2" to NB 3"
- > **ANTISTATIC PFA:** NB 1/2" to NB 3": C4 = A
- > **PTFE:** NB 4" to NB 24"
- > **ANTISTATIC PTFE:** NB 4" to NB 16": C4 = A

Range and thickness Page 5

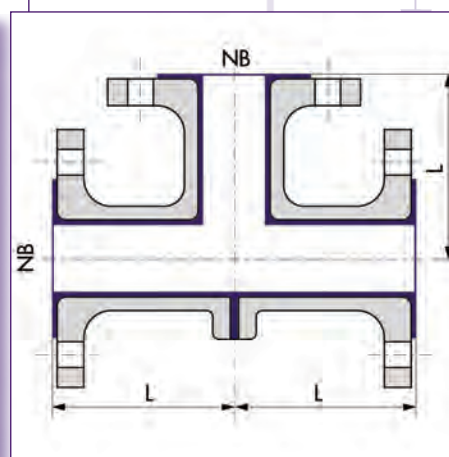
Standard construction: Type P: NB 1/2" to NB 3" and NB 14" to NB 24"
Type W: NB 4" to NB 12"

On request: - 3 loose flanges: C12 = 3
- Ductile iron construction ▲: C13 = F

** FIXED FLANGES TEE TYPE P



DUCTILE IRON TEE ▲



NB1	NB2	L mm	Weight Kg	Référence															
				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					

Standard construction: Type P: Fixed flanges

On request: - 3 loose flanges: C12 = 3

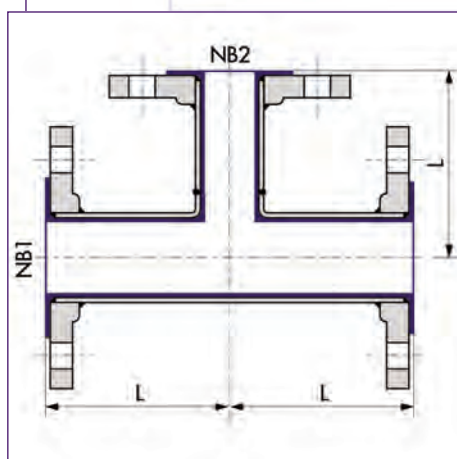
LININGS

> **PFA:** NB 3/4" - NB 3"

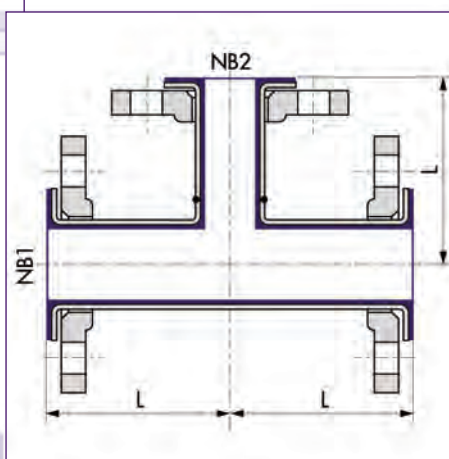
> **ANTISTATIC PFA:** NB 3/4" - NB 3": C4 = A

Range and thickness Page 5

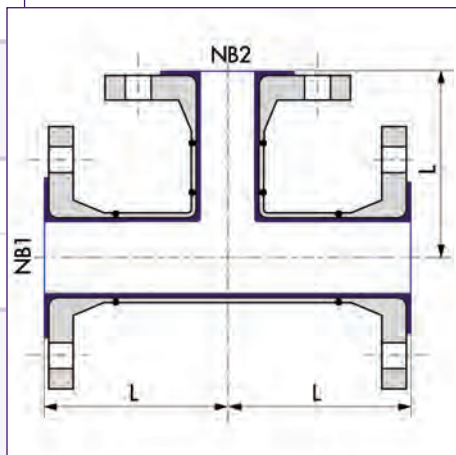
**FIXED FLANGES REDUCING TEE
TYPE P**



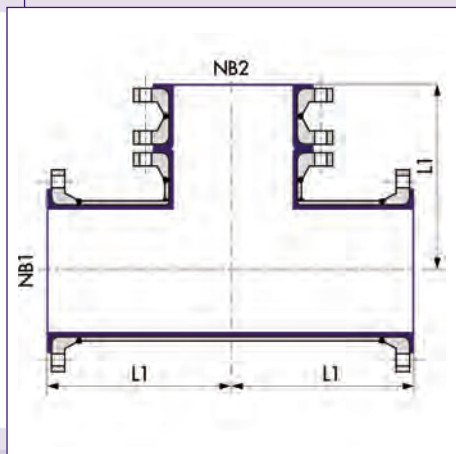
**FLARED STUB END REDUCING TEE
TYPE C**



FIXED FLANGES REDUCING TEE TYPE W



*ISO FIXED FLANGES REDUCING TEE TYPE W



NB1	NB2	L mm	Weight Kg	Reference															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4"	1"	165	19.3	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1 1/2"	165	20.2	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2"	165	21.2	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3"	165	23.9	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6"	1"	203	30.8	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1 1/2"	203	31.7	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2"	203	32.8	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3"	203	35.6	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4"	203	37.9	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8"	1"	229	50.7	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1 1/2"	229	51.6	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2"	229	52.7	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3"	229	55.5	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4"	229	57.8	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6"	229	61.7	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10"	4"	279	78.8	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6"	279	83.0	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8"	279	90.6	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12"	4"	305	104	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6"	305	108	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8"	305	115	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10"	305	122	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14"	4"	356	145	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6"	356*	152	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8"	356*	165	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10"	356*	176	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12"	356*	197	A	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LININGS

- > **VIRGIN PTFE** : NB 4" to NB 14"
- > **ANTISTATIC PTFE** : NB 4" to NB 14" : C4 = A

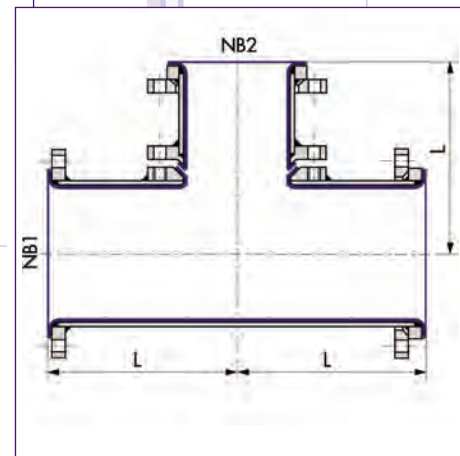
Range and thickness Page 5

Standard construction: Type W: Fixed flanges

On request: - 3 loose flanges: C12 = 3

NB1	NB2	L mm	Weight Kg	Référence															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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					

**** PASTE FIXED FLANGES
REDUCING TEE
TYPE P**





LININGS

> **PTFE**: NB 16" to NB 24"
> **ANTISTATIC PTFE**: NB 16": C4 = A

Range and thickness Page 5

Standard construction: Type P: Fixed flanges

On request: - 3 loose flanges: C12 = 3

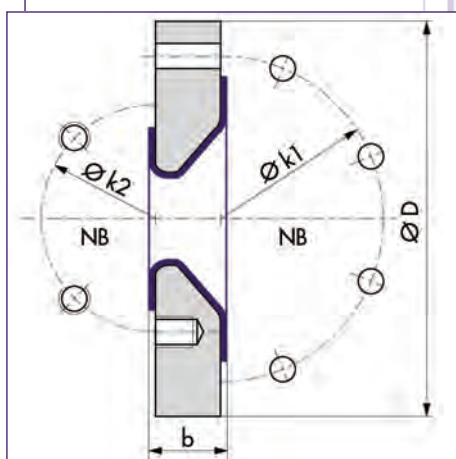
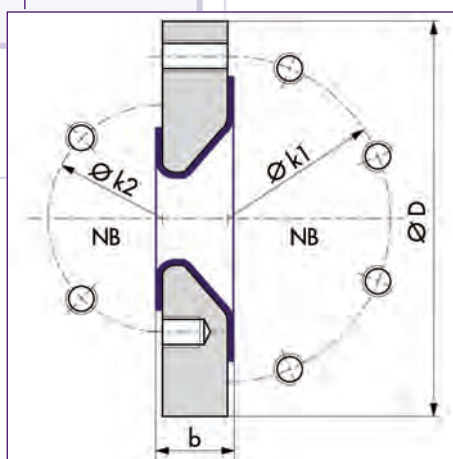
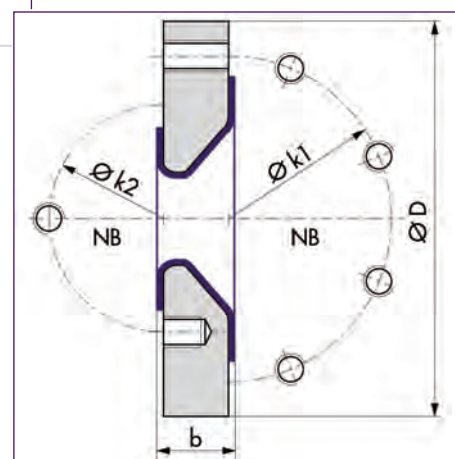
				NB1				NB2						Référence															
NB1	NB2	Ø D	b	Ø k1	Holes			Ø k2	Holes			Type	Weight																
		mm	mm	mm	nb	Ø	UNC	mm	nb	UNC		Kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
3/4"	1/2"*	98	35	69.8	4 x	1/2"		60.3	4 x	1/2"		C	1.9	A	2	-	-	B	R	-	-	-	-	-	-	-	-	-	J H
1"	1/2"*	108	35	79.4	4 x	1/2"		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		60.3	4 x	1/2"		A	6.7	A	2	-	-	B	R	-	-	-	-	-	-	-	-	-	P H
	3/4"	190	35	152.4	4 x	19		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		60.3	4 x	1/2"		A	11	A	2	-	-	B	R	-	-	-	-	-	-	-	-	-	Q H
	3/4"	229	45	190.5	8 x	19		69.8	4 x	1/2"		A	20	A	2	-	-	B	R	-	-	-	-	-	-	-	-	-	Q J
	1"	229	45	190.5	8 x	19		79.4	4 x	1/2"		A	11	A	2	-	-	B	R	-	-	-	-	-	-	-	-	-	Q K
	1"1/2	229	45	190.5	8 x	19		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

LININGS

> **PTFE** : NB 3/4" to NB 4"> **ANTISTATIC PTFE** : NB 3/4" to NB 4": C4 = A

Range and thickness Page 5

TAPPED HOLE/THROUGH HOLE
TYPE ATAPPED HOLES
TYPE BTAPPED HOLES ON CENTER-
LINE/OFF CENTER-LINE TYPE C

				NB1				NB2						Reference															
NB1	NB2	Ø D	b	Ø k1	Holes			Ø k2	Holes		Type	Weight																	
		mm	mm	mm	nb	Ø	UNC	mm	nb	UNC		Kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
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	12 x	25.5		152.4	4 x	1/2"	A	33	A 2	-	-	B R	-	-	-	-	U	P							
	4"	406	45	362	12 x	25.5		190.5	8 x	5/8"	A	33	A 2	-	-	B R	-	-	-	-	U	Q							
	6"	406	45	362	12 x	25.5		241.3	8 x	3/4"	A	30	A 2	-	-	B R	-	-	-	-	U	S							
	* 8"	406	45	362	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							
14"	6"	533	50	476.2	12 x	28.6		241.3	8 x	3/4"	A	60	A 2	-	-	B R	-	-	-	-	W	S							
	8"	533	50	476.2	12 x	28.6		298.4	8 x	3/4"	A	56	A 2	-	-	B R	-	-	-	-	W	T							
	10"	533	50	476.2	12 x	28.6		361.9	12 x	7/8"	A	53	A 2	-	-	B R	-	-	-	-	W	U							
	12"	533	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"1/8	B	83	A 2	-	-	B R	-	-	-	-	Z	Y							
24"	18"	813	50	749.3	20 x	35		577.8	16 x	1"1/8	A	80	A 2	-	-	B R	-	-	-	-	B	Y							
	20"	813	50	749.3	20 x	35		635.0	20 x	1"1/8	A	78	A 2	-	-	B R	-	-	-	-	B	Z							

* cylindrical bore

LININGS

> **PTF:** NB 6" to NB 24"
 > **ANTISTATIC PTFE:** NB 6" to NB 16": C4 = A

NB1	NB2	L	E	Weight	Référence															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		mm	mm	Kg																
1"	1/2"	114	3.4	1.6	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	3/4"	114	3.4	1.8	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
1 1/2"	1/2"	114	10	2.3	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	3/4"	114	10	2.5	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	1"	114	7.0	2.9	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
2"	3/4"	127	4.6	3.5	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	1"	127	13	3.9	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	1 1/2"	127	5.7	4.6	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
3"	1 1/2"	152	20	7.2	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	2"	152	14	8.2	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
4"	1 1/2"	178	32	9.5	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	2"	178	26	10.5	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	3"	178	13	13.1	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
6"	3"	229	40	17.6	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	4"	229	26	19.9	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
8"	4"	279	52	28.5	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	6"	279	25	32.6	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
10"	4"	305	76	35.7	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	6"	305	52	40.0	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	8"	305	27	47.6	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
12"	6"	356	75	53.1	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	8"	356	51	61.2	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
10"	10"	356	26	67.7	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
14"	6"	406	91	66.7	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	8"	406	67	75.3	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	10"	406	41	82.1	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
12"	12"	406	16	92.7	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
16"	8"	457	92	90.4	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	10"	457	66	97.5	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	12"	457	41	108	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
14"	14"	457	25	120	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
18"	10"	483	92	108	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	12"	483	66	118	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	14"	483	51	130	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
16"	16"	483	25	142	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
20"	12"	508	91	139	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	14"	508	76	152	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
	16"	508	51	163	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
18"	18"	508	25	172	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-
24"	20"	610	51	226	A 2	-	-	R	?	-	-	-	-	-	-	-	-	-	-	-

⊘ = C : Concentric reducer

⊘ = E : Eccentric reducer

LININGS

> **PTFE** : NB 3/4" to NB 24"

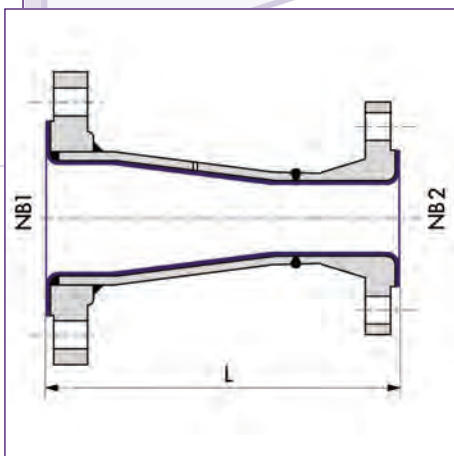
> **ANTISTATIC PTFE** : NB 3/4" to NB 16" : C4 = A

Range and thickness Page 5

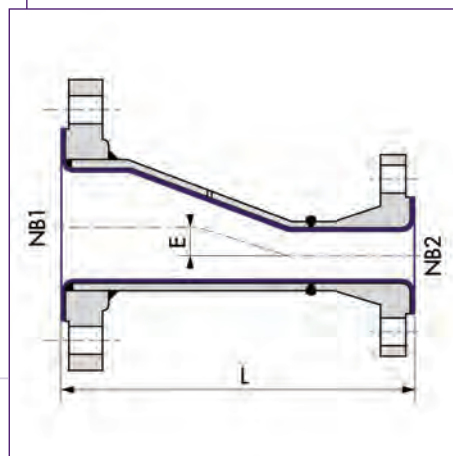
Standard construction : Fixed flanges

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

CONCENTRIC REDUCER



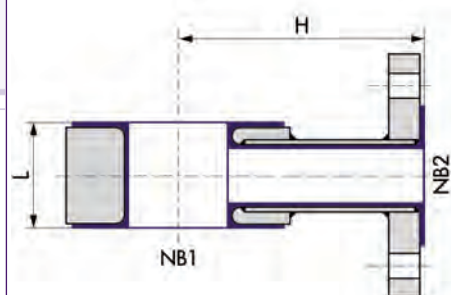
ECCENTRIC REDUCER



NB1	NB2	L	H	Weight	Référence																NB1	NB2	L	H	Weight	Référence																	
		mm	mm	kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			mm	mm	kg	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										8"	1/2"	50	229	10	A	2	-	-	P	I	-	-	-	-	T	H	
	3/4"	50	89	1.9	A	2	-	-	P	I	-	-	-	-	K	J											3/4"	50	229	10	A	2	-	-	P	I	-	-	-	-	T	J	
	1"	50	89	2.0	A	2	-	-	P	I	-	-	-	-	K	K											1"	50	229	10	A	2	-	-	P	I	-	-	-	-	T	K	
1"1/2	1/2"	50	102	2.7	A	2	-	-	P	I	-	-	-	-	M	H											1"1/2	75	229	16	A	2	-	-	P	I	-	-	-	-	T	M	
	3/4"	50	102	2.8	A	2	-	-	P	I	-	-	-	-	M	J											2"	90	229	17	A	2	-	-	P	I	-	-	-	-	T	N	
	1"	50	102	3.0	A	2	-	-	P	I	-	-	-	-	M	K											10"	1"	50	279	24	A	2	-	-	P	I	-	-	-	-	U	K
2"	1"1/2	75	102	4.6	A	2	-	-	P	I	-	-	-	-	M	M											1"1/2	75	279	26	A	2	-	-	P	I	-	-	-	-	U	M	
	1/2"	50	114	4.7	A	2	-	-	P	I	-	-	-	-	N	H											2"	90	279	27	A	2	-	-	P	I	-	-	-	-	U	N	
	3/4"	50	114	4.8	A	2	-	-	P	I	-	-	-	-	N	J											12"	1"	50	305	26	A	2	-	-	P	I	-	-	-	-	V	K
	1"	50	114	5.0	A	2	-	-	P	I	-	-	-	-	N	K											1"1/2	75	305	29	A	2	-	-	P	I	-	-	-	-	V	M	
	1"1/2	75	114	8.4	A	2	-	-	P	I	-	-	-	-	N	M											2"	90	305	30	A	2	-	-	P	I	-	-	-	-	V	N	
3"	2"	90	114	9.9	A	2	-	-	P	I	-	-	-	-	N	N											14"	1"	50	356	41	A	2	-	-	P	I	-	-	-	-	W	K
	1/2"	50	140	5.7	A	2	-	-	P	I	-	-	-	-	P	H											1"1/2	75	356	44	A	2	-	-	P	I	-	-	-	-	W	M	
	3/4"	50	140	5.8	A	2	-	-	P	I	-	-	-	-	P	J											2"	90	356	45	A	2	-	-	P	I	-	-	-	-	W	N	
	1"	50	140	6.0	A	2	-	-	P	I	-	-	-	-	P	K											16"	1"	50	381	46	A	2	-	-	P	I	-	-	-	-	X	K
	1"1/2	75	140	11	A	2	-	-	P	I	-	-	-	-	P	M											1"1/2	75	381	48	A	2	-	-	P	I	-	-	-	-	X	M	
4"	2"	90	140	12	A	2	-	-	P	I	-	-	-	-	P	N											2"	90	381	50	A	2	-	-	P	I	-	-	-	-	X	N	
	1/2"	50	165	6.7	A	2	-	-	P	I	-	-	-	-	Q	H											18"	1"	50	419	51	A	2	-	-	P	I	-	-	-	-	Y	K
	3/4"	50	165	6.8	A	2	-	-	P	I	-	-	-	-	Q	J											1"1/2	75	419	54	A	2	-	-	P	I	-	-	-	-	Y	M	
	1"	50	165	7.0	A	2	-	-	P	I	-	-	-	-	Q	K											2"	90	419	55	A	2	-	-	P	I	-	-	-	-	Y	N	
6"	1"1/2	75	165	12	A	2	-	-	P	I	-	-	-	-	Q	M											*20"	1"	50	457	60	A	2	-	-	P	I	-	-	-	-	Z	K
	1/2"	50	203	8.9	A	2	-	-	P	I	-	-	-	-	S	H											1"1/2	75	457	63	A	2	-	-	P	I	-	-	-	-	Z	M	
	3/4"	50	203	9.0	A	2	-	-	P	I	-	-	-	-	S	J											2"	90	457	64	A	2	-	-	P	I	-	-	-	-	Z	N	
	1"	50	203	10	A	2	-	-	P	I	-	-	-	-	S	K											*24"	1"	100	559	69	A	2	-	-	P	I	-	-	-	-	B	K
	1"1/2	75	203	15	A	2	-	-	P	I	-	-	-	-	S	M											1"1/2	150	559	72	A	2	-	-	P	I	-	-	-	-	B	M	
	2"	90	203	16	A	2	-	-	P	I	-	-	-	-	S	N											2"	150	559	73	A	2	-	-	P	I	-	-	-	-	B	N	

* 2 parts construction

FIXED FLANGE

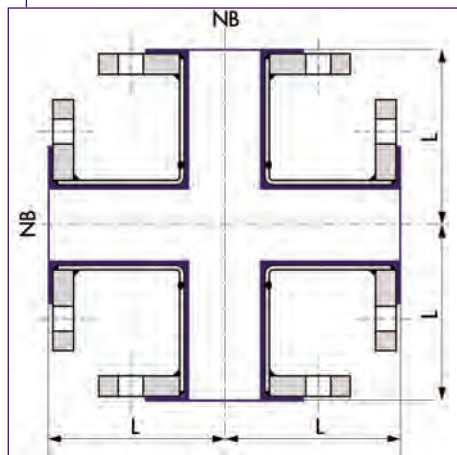


LININGS

- > **PFA**: NB 1" to NB 8"
- > **ANTISTATIC PFA**: NB 1" to NB 8": C4 = A
- > **PTFE**: NB 10" to NB 24"
- > **ANTISTATIC PTFE**: NB 10" to NB 16": C4 = A

Range and thickness Page 5

FIXED FLANGES CROSS TYPE P



NB	L mm	Weight Kg	Référence															
			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						

LININGS

- > **PFA** : NB 1/2" to NB 3"
- > **ANTISTATIC PFA** : NB 1/2" to NB 3" : C4 = A
- > **PTFE** : NB 4" to NB 24"
- > **ANTISTATIC PTFE** : NB 4" to NB 16" : C4 = A

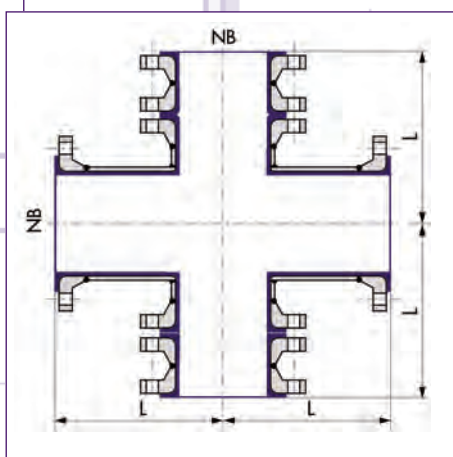
Range and thickness Page 5

Standard construction: Type P: NB 1/2" to NB 3"
and NB 18" to NB 24"

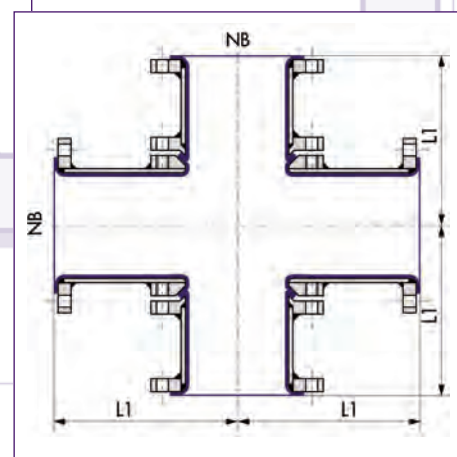
Type W: NB 4" to NB 16"

On request: - 4 loose flanges: C12 = 4

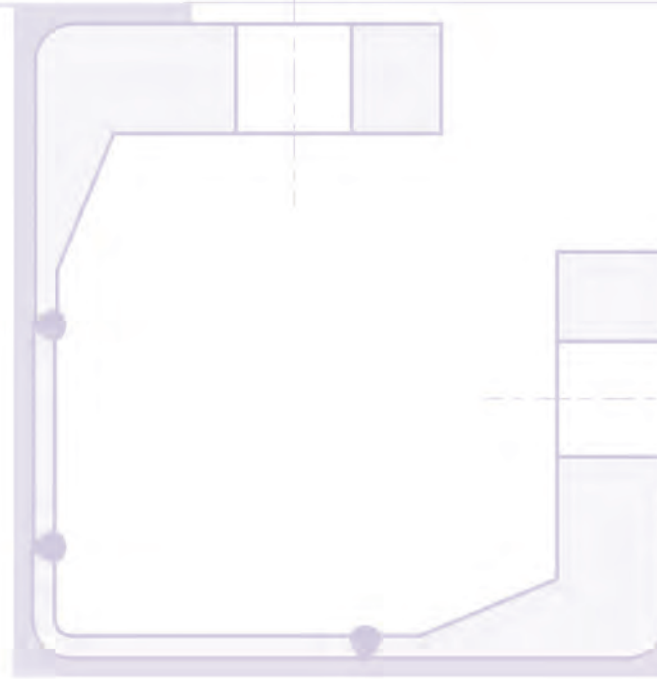
ISO FIXED FLANGES CROSS TYPE W *IN 3 PARTS



** PASTE FIXED FLANGES CROSS TYPE P



NB1	NB2	L	Weight	Référence															
		mm	Kg	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					



Standard construction : Type P

On request : - 4 loose flanges : C12 = 4

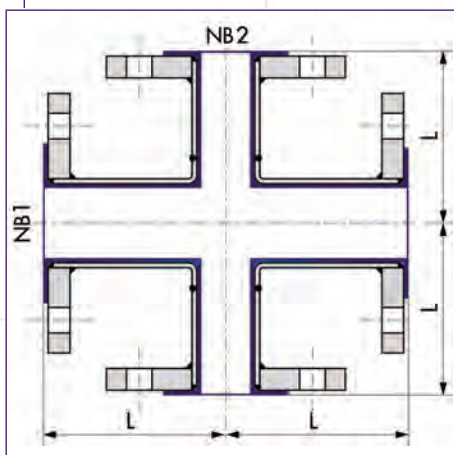
LININGS

> **PFA**: NB 3/4" to NB 3"

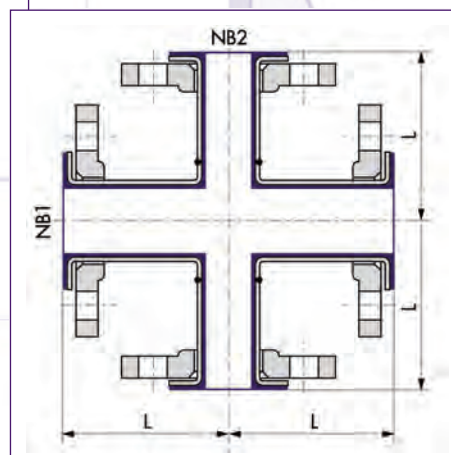
> **ANTISTATIC PFA**: NB 3/4" to NB 3": C4 = A

Range and thickness Page 5

FIXED FLANGES REDUCING CROSS TYPE P



FLARED STUB END CROSS TYPE C



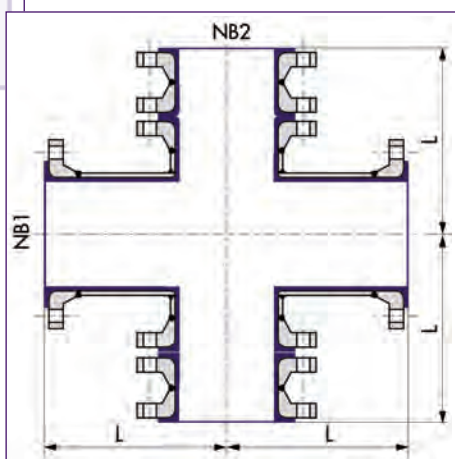
NB1	NB2	L1 mm	Weight Kg	Reference															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4"	1"	165	19.3	A	2	-	-	X	R	-	-	-	-	Q	K				
	1 1/2"	165	20.2	A	2	-	-	X	R	-	-	-	-	Q	M				
	2"	165	21.2	A	2	-	-	X	R	-	-	-	-	Q	N				
	3"	165	23.9	A	2	-	-	X	R	-	-	-	-	Q	P				
6"	1"	203	30.8	A	2	-	-	X	R	-	-	-	-	S	K				
	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	-	-	X	R	-	-	-	-	-	T	Q				
	6"	229	61.7	A	2	-	-	X	R	-	-	-	-	T	S				
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				

LININGS

- > **PTFE:** NB 4" to NB 14"
- > **ANTISTATIC PTFE:** NB 4" to NB 14": C4 = A

Range and thickness Page 5

ISO FIXED FLANGES REDUCING CROSS TYPE W *IN 3 PARTS



Standard construction: Type W: Fixed flanges

On request: - 4 loose flanges: C12 = 4

NB1	NB2	L	Weight	Référence																
		mm	Kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
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						

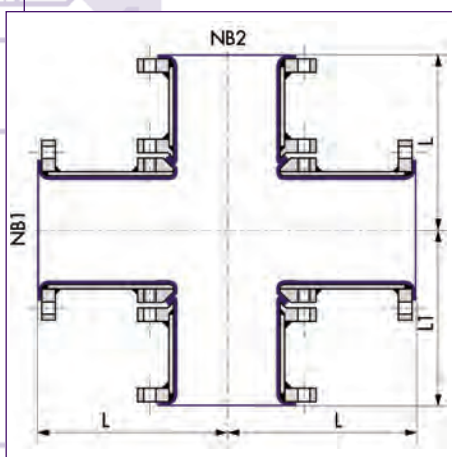
Standard construction: Type P: Fixed flanges
On request : - 4 loose flanges: C12 = 4

LININGS

> **PTFE:** NB 18" to NB 24"
> **ANTISTATIC PTFE:** NB 16": C4 = A

Range and thickness Page 5

PASTE FIXED FLANGES REDUCING CROSS TYPE P



NB	Ø A mm	F L max mm	G		H		Référence																		
			L min mm	L max mm	L min mm	L max mm	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	20	60	60	160	A	2	-	-	-	-	x	x	x	S									
8"	279	20	20	70	70	180	A	2	-	-	-	-	x	x	x	T									
10"	339	20	20	70	70	210	A	2	-	-	-	-	x	x	x	U									
12"	409	20	20	70	70	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	80	260	A	2	-	-	-	-	x	x	x	X									
18"	549	20	20	80	80	270	A	2	-	-	-	-	x	x	x	Y									
20"	590	20	20	80	80	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

xxx : length in mm

LININGS

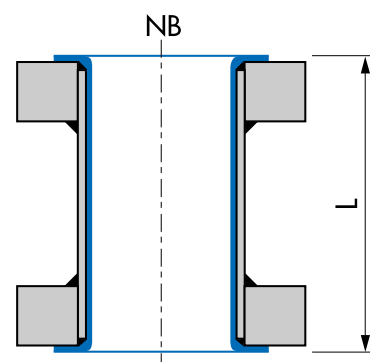
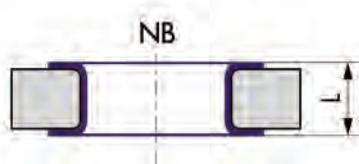
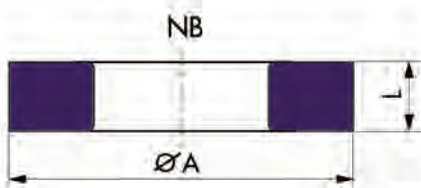
- > **PTFE** : NB 1/2" to NB 24"
- > **ANTISTATIC PTFE** : NB 1/2" to NB 16": C4 = A

Range and thickness Page 5

MASSIVE PTFE SPACER SHAPE F

STEEL ARMORED SPACER SHAPE G

STEEL LINED SPACER SHAPE H



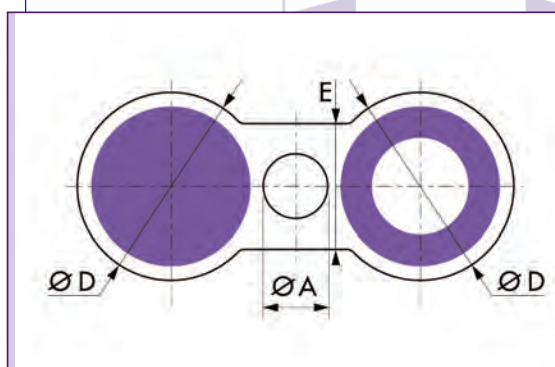
NB	ØD	C	E	ØA	b	Weight	Référence															
	mm	mm	mm	mm	mm	Kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2"	44	60	35	16	14	0.2	A	2	-	-	O	B	-	-	-	H						
3/4"	53	70	35	16	14	0.2	A	2	-	-	O	B	-	-	-	J						
1"	63	78	35	16	14	0.3	A	2	-	-	O	B	-	-	-	K						
1 1/2"	82	98	50	16	14	0.4	A	2	-	-	O	B	-	-	-	M						
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	19	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	22	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	26	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	75	35	39	73.7	A	2	-	-	O	B	-	-	-	B						

LININGS

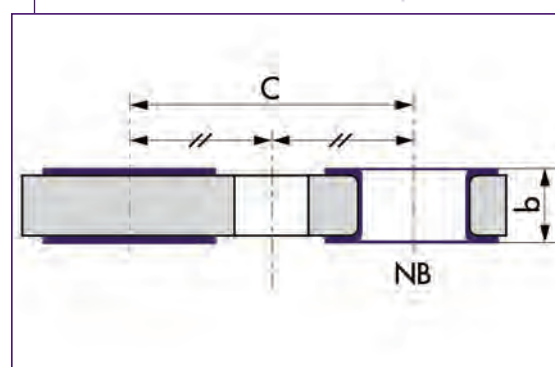
> **PTFE**: NB 3/4" to NB 24"
 > **ANTISTATIC PTFE**: NB 3/4" to NB 16": C4 = A

Range and thickness Page 5

SPECTACLE BLIND (front view)



SPECTACLE BLIND (sectional view)



BLINDS FLANGES

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

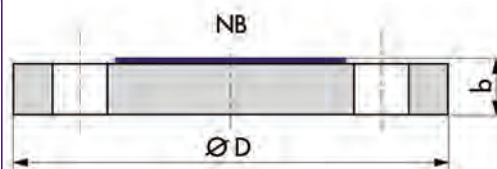
NB	ØD	b	Weight	Reference
	mm	mm	Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
10"	406	34	28	A 2 - - B P - - - U
12"	482	36	45	A 2 - - B P - - - V
14"	533	39	58	A 2 - - B P - - - W
16"	597	40	76	A 2 - - B P - - - X
18"	635	44	92	A 2 - - B P - - - Y
20"	698	47	119	A 2 - - B P - - - Z
24"	813	52	181	A 2 - - B P - - - B

LININGS

- > **PTFE**: NB 1/2" to NB 24"
- > **ANTISTATIC PTFE**: NB 1/2" to NB 16": C4 = A

Range and thickness Page 5

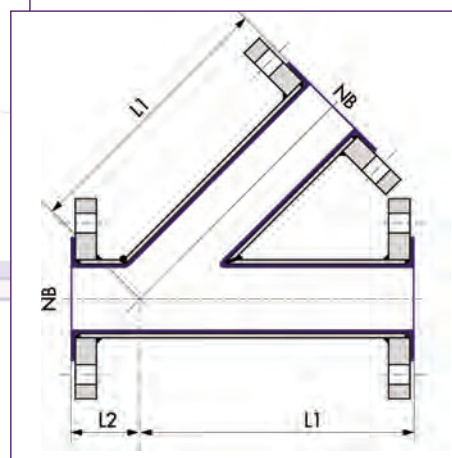
BLIND FLANGES



LATERAL TEES

NB	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

LATERAL TEES TYPE P



LININGS

- > **PFA**: NB 1" to NB 4"
- > **ANTISTATIC PFA**: NB 1" to NB 4": C4 = A
- > **PTFE**: NB 6" to NB 8": C4 = A
- > **ANTISTATIC PTFE**: NB 6" to NB 8": C4 = A

Range and thickness Page 5

Standard construction: Type P: Fixed flanges

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
	1 1/2"	114	114
	2"	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

NB1	NB2	H	L1
		mm	mm
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

DRAWING BELOW IS SHOWN AS AN EXAMPLE :
other manifold configurations on request: number,
NB and inclination of the branches etc.

L max : 1500 mm

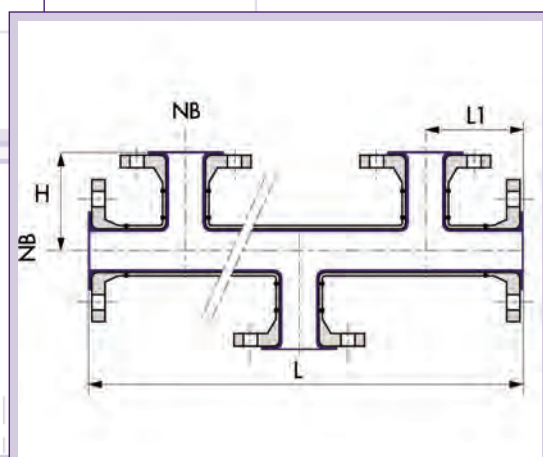
LININGS


> **PTFE** : NB 1" to NB 12"

> **ANTISTATIC PTFE** : NB 1" to NB 12": C4 = A

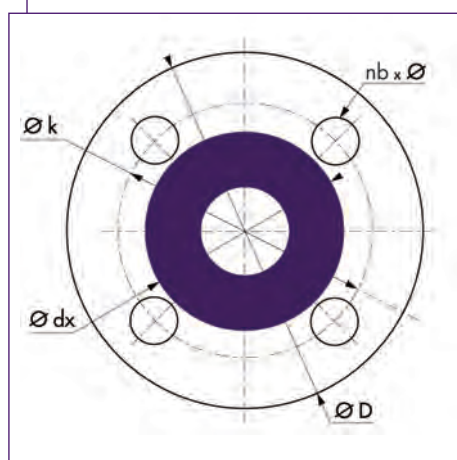
Range and thickness Page 5

FIXED FLANGES MANIFOLD TYPE W

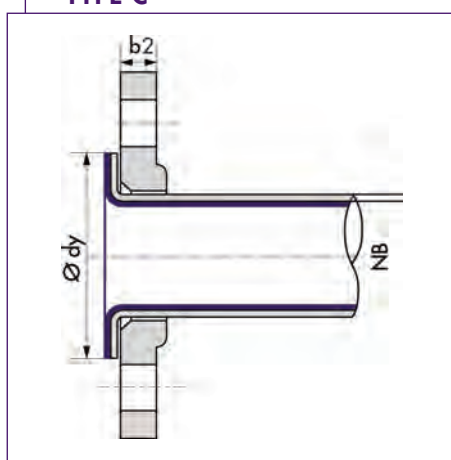


NB	D	dx mini*	dy	dz	k	b1	b2	b3	holes		
									nbr	Ø	UNC
1/2"	95	31.8	36	42	66.7	14.3	12.7	12	4	16	1/2
3/4"	117	39.7	42	52	82.5	15.9	14.3	14	4	19	5/8
1"	124	47.6	51	60	88.9	17.5	15.9	14	4	19	5/8
1 1/2"	156	68.3	72	73	114.3	20.6	19.6	14	4	23	3/4
2"	165	87.3	90	92	127.0	22.2	20.6	16	8	19	5/8
3"	210	117.5	125	127	168.3	28.6	27.0	18	8	23	3/4
4"	254	150.8	155	157	200.0	31.7	30.1	20	8	23	3/4
6"	318	203.2	210	216	269.9	36.5	34.9	22	12	23	3/4
8"	381	255.6	262	270	330.2	41.3	39.7	26	12	26	7/8
10"	445	311.2	320	324	387.3	47.6	46.0	30	16	29	1
12"	520	365.1	370	381	450.8	50.8	49.2	34	16	32	1 1/8
14"	585	393.7	413	413	514.3	54.0	52.4	36	20	32	1 1/8
16"	650	450.9		470	571.5	57.1	55.5	42	20	35	1 1/4
18"	710	514.4		533	628.6	60.3	58.7	46	24	35	1 1/4
20"	775	565.2		584	685.8	63.5	61.9	50	24	35	1 1/4
24"	915	666.8		692	812.8	69.8	68.2	54	24	42	1 1/2

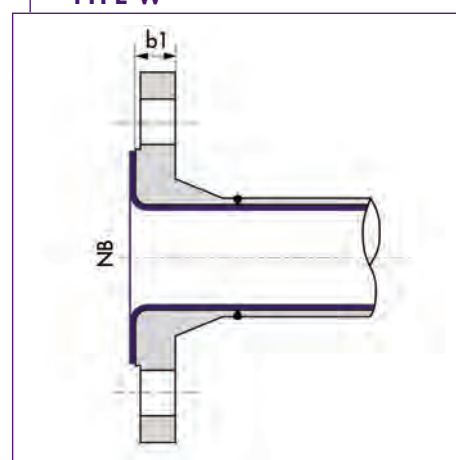
FLANGE (front view)



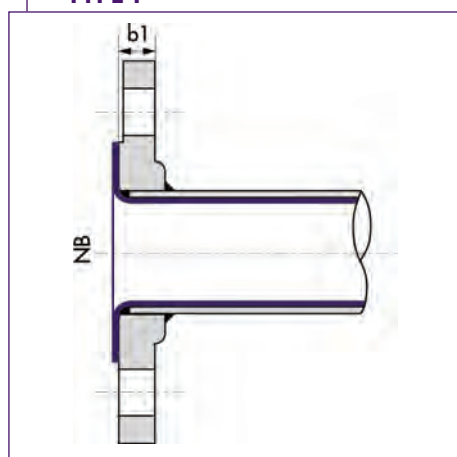
FLARED STUB END
TYPE C



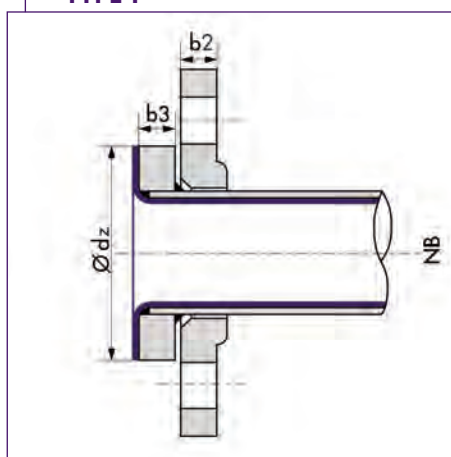
WELDING NECK
TYPE W



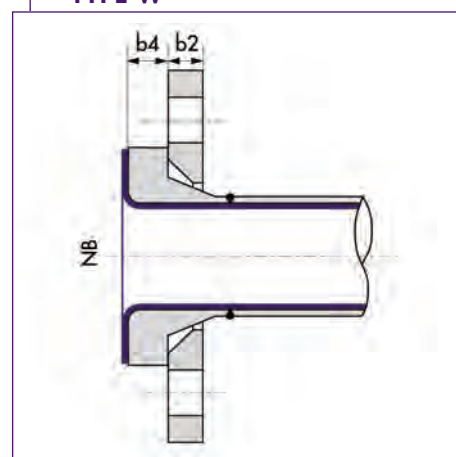
SLIP-ON
TYPE P



COLLAR + SLIP ON
TYPE P



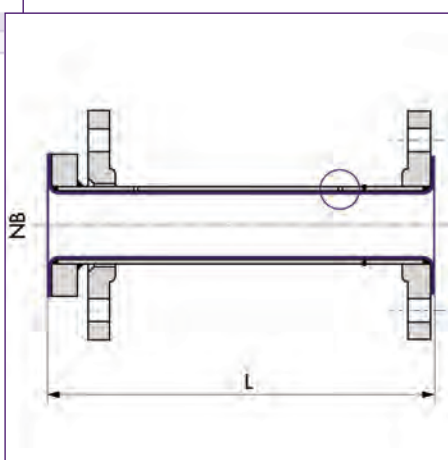
COLLAR + SLIP ON
TYPE W



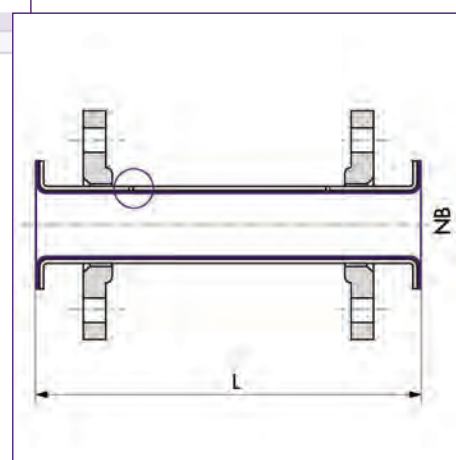
NB	L mini (mm)		Weight Kg/meter	Weight	
	A	B		pair A	pair B
1/2"	100		2.1	1.7	
3/4"	110		2.1	2.7	
1"	115	115	2.5	3.3	3.0
1 1/2"	120	120	5.0	5.9	5.7
2"	140	130	6.7	7.0	6.6
3"	170	170	13.7	13.8	13.2
4"	200	180	19.2	21.5	20.5
6"	210	200	34.1	35.3	33.7
8"	230	200	52.9	52.9	50.9

NB	L mini (mm)		Weight Kg/meter	Weight pair A
	A			
10"	250		63.9	77.4
12"	280		65.5	110
14"	280		85.3	150
16"	300		97.9	191
18"	330		110	232
20"	350		132	280
24"	400		161	406

FIXED FLANGE/LOOSE FLANGE



FLARED STUB END



ANSI 300 LBS FITTINGS

For fittings, ANSI 300 lbs linings are identical to 150 lbs parts and standard construction. Please be aware that for instrument tees, L is given for a 1" nozzle.

NB	90° Elbow		45° Elbow		Tee		Exc./Conc. Reducer		Inst. Tee	
	L (mm)	W (Kg)	L (mm)	W (Kg)	L (mm)	W (Kg)	L (mm)	W (Kg)	L (mm)	H (mm)
1"	102	3.5	57	3.3	102	5.3	114	3.0	50	102
1 1/2"	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"	152	16.2	89	14.0	152	25.2	152	11.3	50	152
4"	178	25.7	114	23.0	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	71.0	152	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	407	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

* 2 parts construction

** 3 parts construction

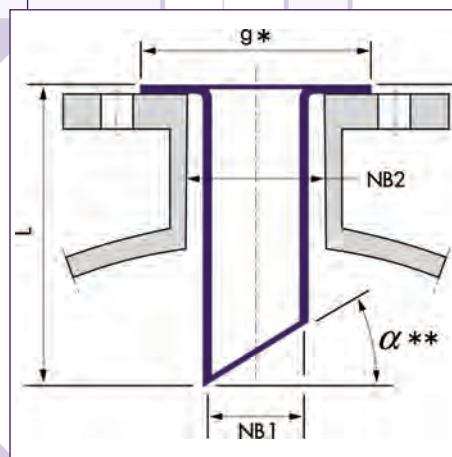
■ Does not conform to ANSI NB 16.5 standard

NB 1

ENTRY PIPES			
NB1	NB2	L max	Reference
		mm	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 1/4"	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

xxxx : length in mm

TYPE A



*Ø G flare in accordance with NB 2

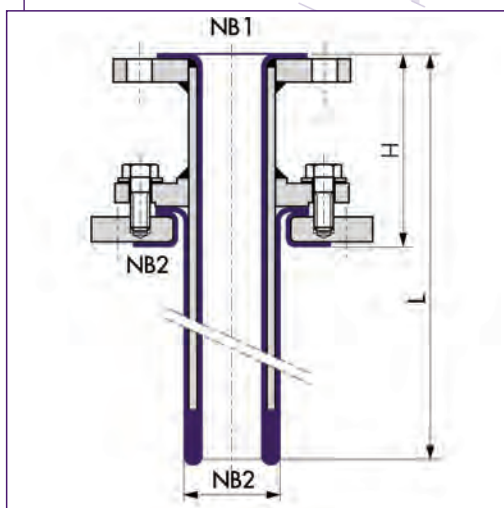
LININGS

- > **PTFE** : NB 1 1/2" to NB 20"
- > **ANTISTATIC PTFE** : NB 1 1/2" to NB 16" : C4 = A

Range and thickness Page 5

Other special dip pipes are available on request.

TYPE B



DIP PIPES

DN1	DN2	H	L max
	mini	mm	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

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