GROUPE CARBONE LORRAINE

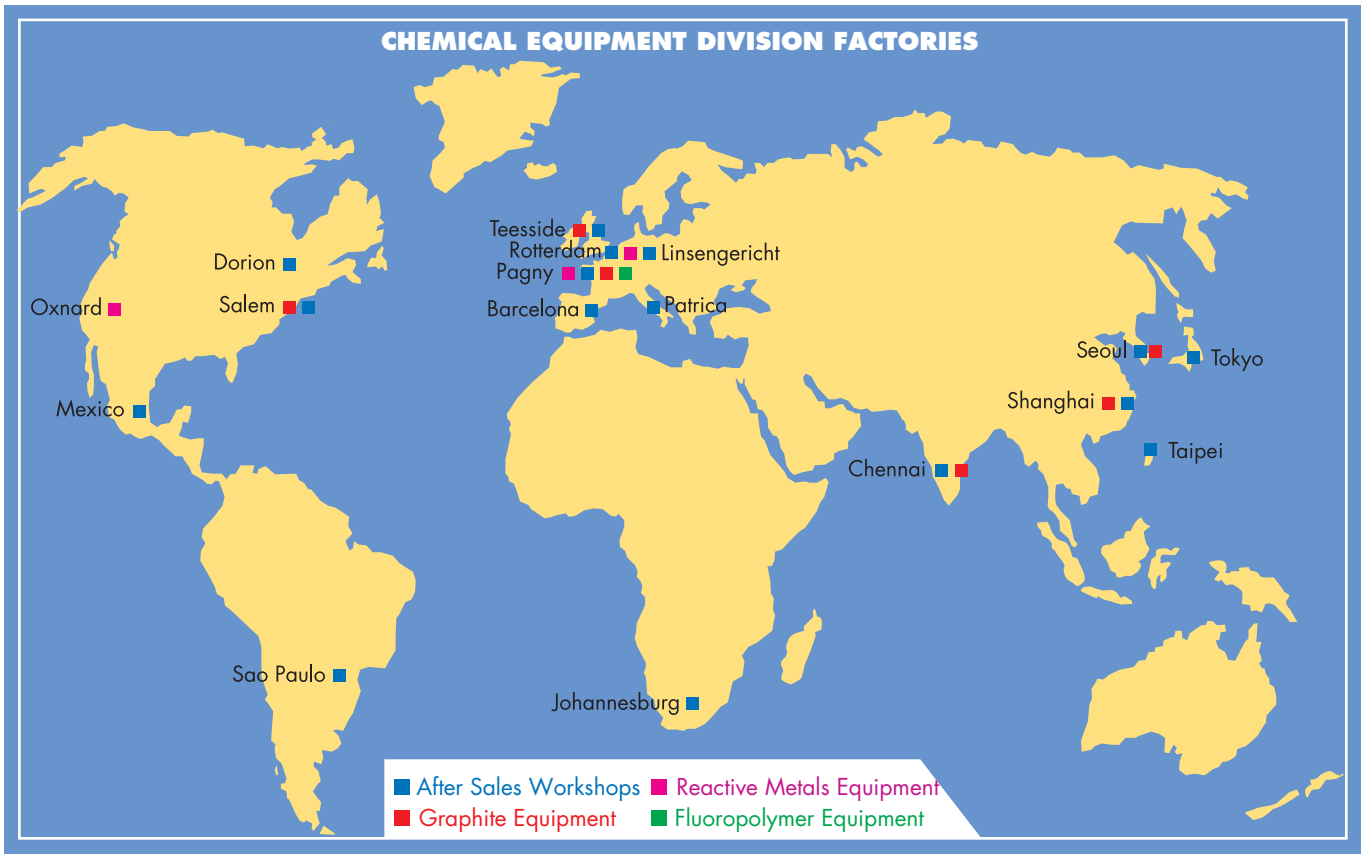
CED CHEMICAL EQUIPMENT DIVISION

CHEMICAL EQUIPMENT DIVISION

worldwide specialist in corrosion resistant equipment

has built an international reputation.
based on people, methods and technical expertise,
we contribute to our customer's success using the
quality and innovation of our products and services.

A global player



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CHEMICAL EQUIPMENT DIVISION

ISO 9001

ISO 14001

ARMYLOR®
PTFE / PFA LINED PIPING AND ACCESSORIES DIN 2848

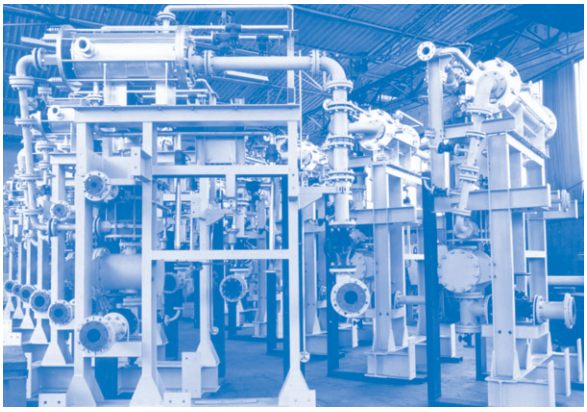
GROUPE CARBONE LORRAINE

CARBONE LORRAINE CHEMICAL EQUIPMENT

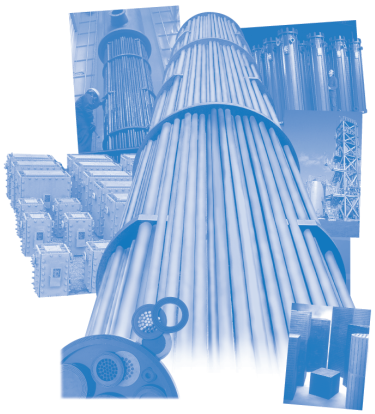
MANUFACTURER OF PTFE/PFA LINED PIPING

Since 1964, the CARBONE LORRAINE group has been a pioneer in the transport and storage of corrosive fluids. Experience combined with ongoing improvement and the development 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 fluorated polymer applications: PTFE/PFA.

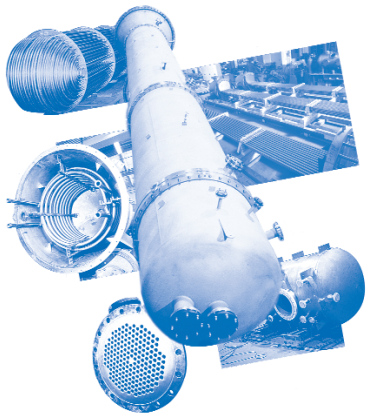


ARMYLOR® is the ideal solution for transferring or treating fluids in extreme conditions.



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

The CARBONE LORRAINE site at Pagny-sur-Moselle has ISO 14001 certification for environmental aspects and ISO 9001 for quality assurance, and the products manufactured are in conformity with the DESP 97.23 EC European directive.

APPLICATION PROCESSES

In 2003, two other processing techniques were introduced to complement the CARBONE LORRAINE paste extrusion process, namely iso-moulding and PFA transfer moulding, following the introduction of the 3P lined piping activity.

SERVICE

In order to optimize its reactivity, CARBONE LORRAINE has its own welding shop and has a large stock of finished products available.
Most of our subsidiaries stock fittings and can manufacture straight lengths on demand.

ARMYLOR® RANGE PRESENTATION

ACCORDING TO DIN 2848

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 expansion compensators).

The ARMYLOR® range can also be supplied in conformity with ANSI B 16-5.
150 lbs ASA and 300 lbs ASA flanges.

The nominal diameters (DN) range from DN 15 (1/2") to DN 600 (24") for accessories 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 conformity with the DESP 97.23 EC European Directive and can be supplied with a stainless steel or low-temperature steel shell.

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 accordance with the ASTM D489 & 4895 standards.

>> Virgin or anti static PFA (perfluoroalkoxy), according to ASTM D 3307** standards.

*** Also on request according to DIN 53455 standard*

2 GENERAL CHARACTERISTICS

The values indicated in the following table correspond to virgin PTFE.
These characteristics can vary according to the materials supplied, the transformation processes and their components.

PROPERTIES	Units	PTFE	PFA
Physical			
Density	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			
Dielecttric 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}
Dielecttric 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

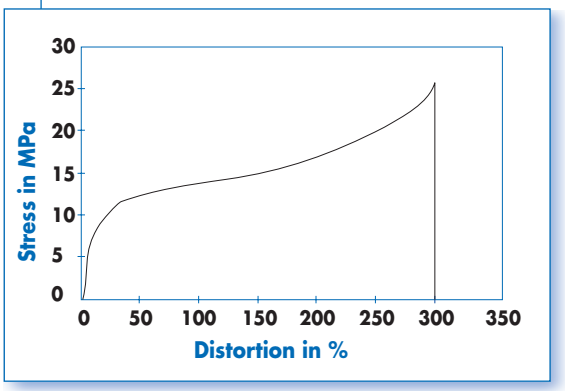
DN	Straight Lengths		Elbows		Tees		Conc. / Exc. Red		Intrument tees		Manifolds	
	G	V	G	V	G	V	G	V	G	V	G	V
15	1.8	3.0		3.0		3.0		3.0		3.0		3.0
20	2.0	3.0		3.0		3.0		3.0		3.0		4.0
25	2.0	3.0		3.3		3.0		3.5		3.0		4.0
32	2.5	3.0		4.0		3.3		3.5		3.3		5.0
40	2.5	3.0		4.0		3.5		3.5		3.5		6.0
50	2.5	3.0		4.0		3.5		3.5		3.5		7.0
65	2.5	3.0	3.5	4.0		4.0		3.5		4.0		7.0
80	3.0	3.5	3.5	4.5		4.5		4.0		4.0		9.0
100	3.0	4.2	4.0	7.5		5.0		5.0		5.0	5.0	10.0
125	3.0	5.0	4.8	8.0	5.0	9.0		5.0		5.0	6.0	10.0
150	4.0	5.3	5.0	9.5	6.0	10.0	5.0	5.3		6.0	6.0	11.0
200	4.0	6.2	7.0	10.0	6.0	12.0	6.0	6.2		8.0	7.0	12.0
250	4.0	7.0	7.0	11.0	7.0	12.0	6.5	7.0	7.0	12.0	7.0	12.0
300	4.0	8.0	7.0	12.0	7.0	12.0	6.5	8.0	7.0	12.0	7.0	12.0
350	4.5		8.0	12.0	8.0		8.0		8.0			
400	4.5		8.0		8.0		8.0		8.0			
450	4.5		8.0		8.0		8.0		8.0			
500	4.5		8.0		8.0		8.0		8.0			
600	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 %. The thickness of the collar must be less than the nominal thickness minus 20 %.

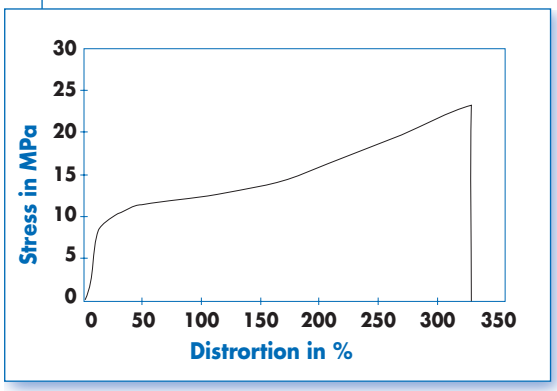
2 CHARACTERISTICS CONTROLLED DURING MANUFACTURE

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

Parrallel direction



Perpendicular direction



Obtaining the elongation at break and tensile strength values, together with the regularity of the graph provides confirmation that the liner sintering has re-established the isotropy of the PTFE, which guarantees a low level or permeability.

Optimum density ensures a balance between a low permeability level and a good distortion during temperature cycles.
Concerning 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 *Test according standard*	± 21 N/mm≤ (Sens //) ± 17 N/mm≤ (Sens ⊥) ASTM D4895	± 250% (Sens //) ± 200% (Sens ⊥) ASTM D4895	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749	
ANTI STATIC *Test according standard*	± 21 N/mm≤ (Sens //) ± 17 N/mm≤ (Sens ⊥) ASTM D4895	± 250% (Sens //) ± 200% (Sens ⊥) ASTM D4895	2.13 - 2.19 ASTM D792	2.12 - 2.18 DIN 53749	
PTFE Molding Virgin *Test according standard*	± 21 N/mm² ASTM D4894	± 250% ASTM D4894	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749	
ANTI STATIC *Test according 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 standard*	± 26 N/mm² ASTM D3307	± 300% ASTM D3307	2.12 - 2.17 ASTM D792	2.12 - 2.17 DIN 53749	1-3 g/10 mn ASTM D3307
ANTI STATIC *Test according standard*	± 26 N/mm² ASTM D3307	± 300% ASTM D3307	2.11 - 2.17 ASTM D792	2.11 - 2.16 DIN 53749	0.5-1.5 g/10 mn ASTM D3307

The results comply with the ASTM F1545 standard.
(Regarding PTFE, tests based on the DIN 2874 standard can also be carried out on request).

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:
a light inspection in the case of virgin PTFE liners and an endoscopic examination in the case of anti static liners.

1 PERMEABILITY

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

Several factors have an influence on the phenomenum :

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

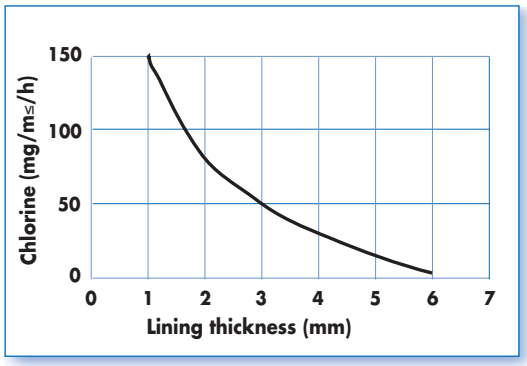
■■■ **The chemical nature of the product :** any chemical similarity between the material passing through and the material passed through increases permeability.

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

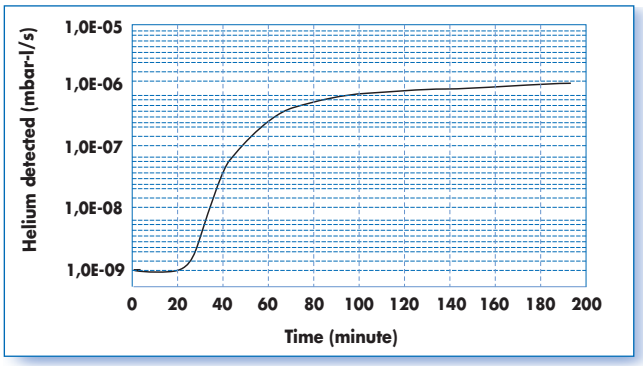
■■■ We obtain the extrusion and isostatic moulding processes result in products with a similar level or permeability.

■■■ Examples of permeability curves:

PTFE/PFA permeability curve



Helium permeability PTFE/PFA curve



2 CREEP ON PTFE

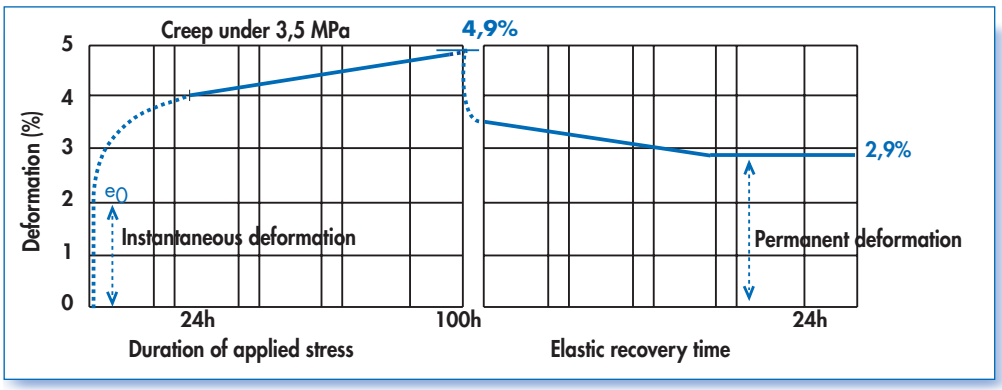
Creep is the deformation of a material over time under the influence of an applied stress. The effect of temperature increases deformation.

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 (e0).

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 ASTM or JIS standards, low temperature or stainless steel can be supplied on request. Contact us for more information.

DESCRIPTION	TUBES / BODIES		FLANGES	
	STANDARD DIMENSIONAL	MIN. GRADE	STANDARD DIMENSIONAL	MIN. GRADE
Straight lengths	EN 10216	P 235 GH / EN 10216	EN 1092	P 235 GH / EN 10222 C22.8 / DIN 17243
Ductile iron 90° elbows		GSJ-400-18-LT / EN 1563		
90° and 45° elbows	DIN 2605 & 2606	ST 35.8 / DIN 17175 ST 37.0 / DIN 1629	EN 1092	P 235 GH / EN 10222 C22.8 / DIN 17243
Ductile iron tees		GSJ-400-18-LT / EN 1563		
Equal tees or reduced Equal crosses/reduced	EN 10216	P 235 GH / EN 10216	EN 1092	P 235 GH / EN 10222 C22.8 / DIN 17243
Concentric Reducers	DIN 2616	ST 35.8 / DIN 17175 ST 37.0 / DIN 1629		P 235 GH / EN 10222 C22.8 / DIN 17243
Reducing flanges			EN 1092	P 235 GH / EN 10028
Spacers				P 235 GH / EN 10028
Instrument tees	EN 10216	P 235 GH / EN 10216 / EN 10028	EN 1092	P 235 GH / EN 10222 C22.8 / DIN 17243

2 WELDING

CARBONE LORRAINE is qualified in accordance with the European standards EN 288.3 (for operational modes) and EN 287.1 (for welders) regarding the A.A.G., M.I.G. & T.I.G. , A.D.M. HP 5.3 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 FLARED STUB END

Regarding straight lengths, CARBONE LORRAINE proposes a backing flange obtained by cold shaping at the tube extremity, from DN 15 to DN 350. This process is in conformity with DESP and has been validated by the T.Ü.V.
A loose flange stop can be supplied on request.

4 SPHEROÏDAL GRAPHITE DUCTILE IRON (S.G)

CARBONE LORRAINE uses S.G. iron in conformity with the EN 1563 standard.

5 VENT HOLES

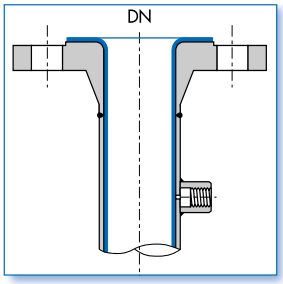
PTFE and PFA lined piping is fitted with vent holes intended to :

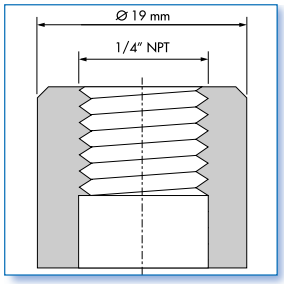
- **Prevent** any back pressure between the metallic housing and the lining.
- **Detect** any possible leaks during pressure tests.
- Quickly **detect** any sign of corrosion.

Straight lengths below 500 mm have one 3 mm diameter vent hole in the middle of the piece. Those above 500 mm are fitted with 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 any vent holes.
In the case of particular specifications or pipe lagging, couplings can be welded to the vent holes.

6 VENT BOSSES

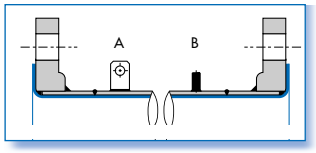
If the vent holes must be identified quickly or when the line is lagged, a coupling can be welded at the vent holes levels.
In the case of different lagging thicknesses, an extension to achieve the size required can be screwed on to the coupling.





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. Regarding fittings and straight lengths below 500 mm, these are welded in the middle of the steel 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. Other materials can be supplied on request.



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, in accordance with the S.A 2.5 cleanliness level.
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:

- **Perpandicularity** 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.
- **Welding** through penetration by COFREND II qualified personnel.

1 DIMENSIONAL TOLERANCES

The lined pieces and their dimensions are indicated in pages 17 to 37.

All the lined pieces are subject to the following tolerances:

5 % for PTFE/PFA collars.

	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°
Connections	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 VACUMM RESISTANCE

DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400
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 =10^5 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 CONTROLS 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.) all piping is subject to the following inspections:

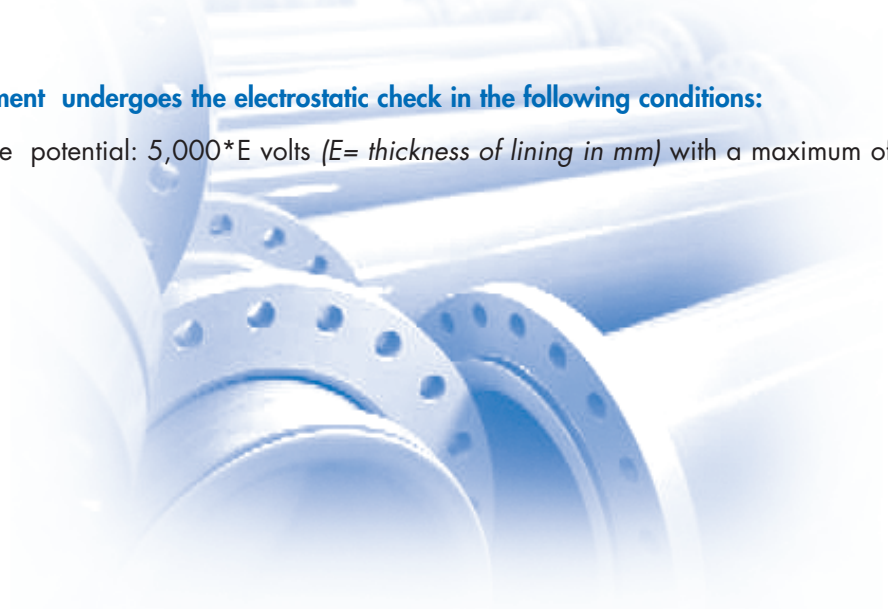
■ 4-1 ■ Dimensional and visual check

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 check

Each 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 25,000 volts.



■ 4-3 ■ Hydrostatic check

This check is carried out on pieces fitted 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 check

A hot pneumatic test is carried out on isomoding pieces and on certain pieces produced from extruded pipes.

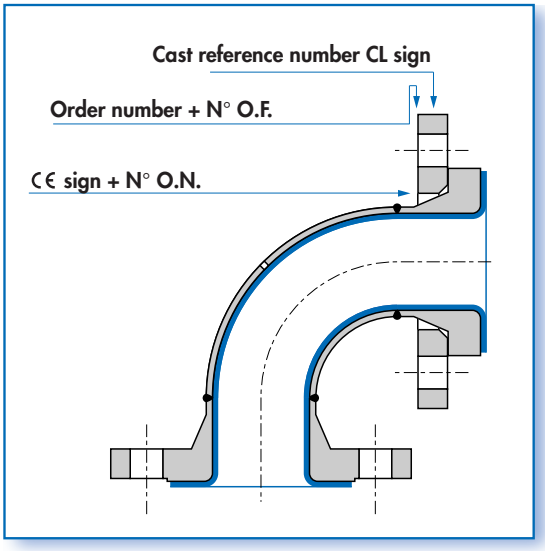
5 TRACEABILITY AND MARKING

■ 5-1 ■ TRACEABILITY

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

■■■ **Steel :** The cast reference number is cold moulded on each steel or ductile iron piece.
CARBONE LORRAINE has been approved by the TÜV to indicate the cast number on cut steel pipes.

■■■ **Finished product : the following information is moulded on the finished piece:**
>> the initials of CARBONE LORRAINE, the order number and the piece number (O.F. number)
>> the CE + 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 plugs or on the plastic material protecting the collar flange.
Additional markings can be included on request.
Depending on the specific requirements of each customer, other types of markings such as a CARBONE LORRAINE label can be supplied.

6 PACKAGING

Straight lengths can be packed as floor-mounted loads or in wooden crates.
Fittings are packed in wooden boxes or in cardboard boxes on pallets.

The ARMYLOR® lined lengths and fittings are high tech products that have been manufactured according to specific standards. The following recommendations will allow for optimum use of our products.

1 PRECAUTIONS

The lined steel elements are delivered equipped with wooden or plastic plugs intended to protect the collars. Remove these protective plugs when the elements are being connected only: they must be refitted after each inspection and when the piece is withdrawn from the installation.
Once the plugs have been removed, the greatest care is required: no contact with the floor, absence of any sharp object that could damage the lining.

2 CLEANING

Flared surface must be carefully cleaned prior to connection.

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.

Thightening 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 PN 10 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.

DN	Nuts	Tightening
	mm	N.m
DN 25	4xM12	30
DN 32	4xM16	45
DN 40	4xM16	60
DN 50	4xM16	80
DN 65	4xM16	100
DN 80	8xM16	60
DN 100	8xM16	70
DN 125	8xM16	90
DN 150	8xM20	130
DN 200	8xM20	180
DN 250	12xM20	160
DN 300	12xM20	210
DN 350	16xM20	260
DN 400	16xM24	330
DN 450	20xM24	290
DN 500	20xM24	330
DN 600	20xM27	460

The tightening torque values indicated apply to :

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

PROCEDURES (CONTINUE)

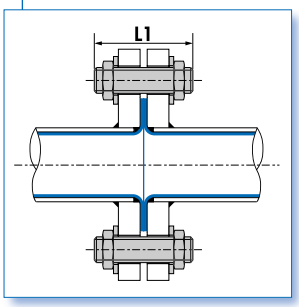
4 BOLT LENGTHS

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

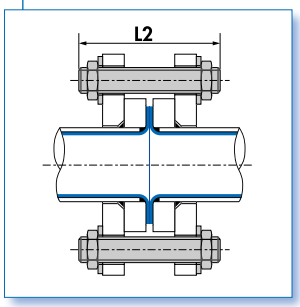
The dimensions indicated refer to:

- **A coupling** equal to 1/3 the diameter of the screwed rod.
- **A nut height** equal to the diameter of the screwed rod.

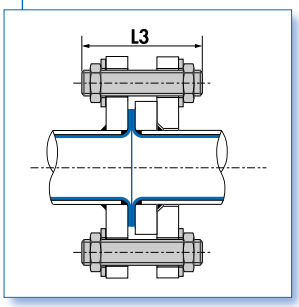
FIXED FLANGE/FIXED FLANGE



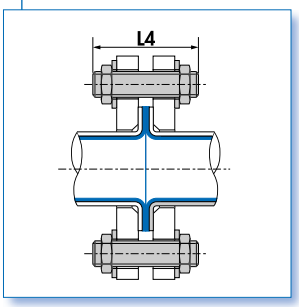
LOOSE FLANGE/LOOSE FLANGE



FIXED FLANGE/LOOSE FLANGE



FLARED STUB END



5 VENT HOLES

Vent holes must not be obstructed by lagging or painting. Where lagging is fitted, 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. The latter also act as corrosion indicators.

DN	L1	L2	L3	L4
	mm	mm	mm	mm
DN 15	75	95	85	
DN 20	80	100	90	
DN 25	80	105	90	85
DN 32	90	115	105	95
DN 40	90	115	105	95
DN 50	95	120	105	95
DN 65	95	125	110	100
DN 80	100	130	115	105
DN 100	105	130	115	115
DN 125	110	135	120	
DN 150	120	150	135	120
DN 200	125	155	140	140
DN 250	130	165	145	145
DN 300	130	175	150	150
DN 350	135	180	155	155
DN 400	160	205	175	
DN 450	170	205	175	
DN 500	170	230	190	
DN 600	170	235	190	

6 FIELD FORMING KIT

To facilitate the task of 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.

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.

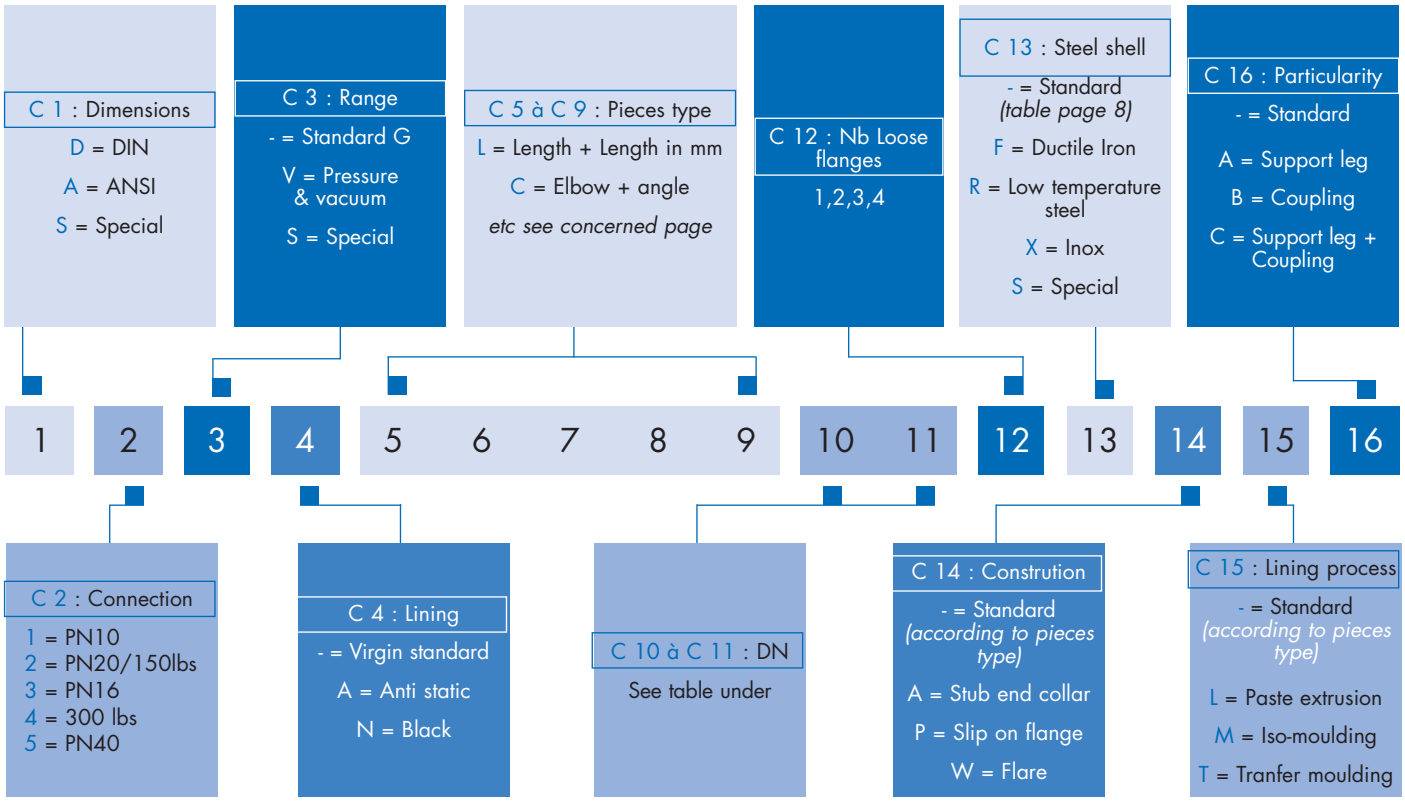
ARMYLOR® RANGE

REFERENCES 15

REFERENCES

Each ARMYLOR® element has a reference, which allow defining it.
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 3PCL standard construction.



REP	DN	REP	DN	REP	DN
H	15	P	80	W	350
J	20	Q	100	X	400
K	25	R	125	Y	450
L	32	S	150	Z	500
M	40	T	200	B	600
N	50	U	250		
O	65	V	300		

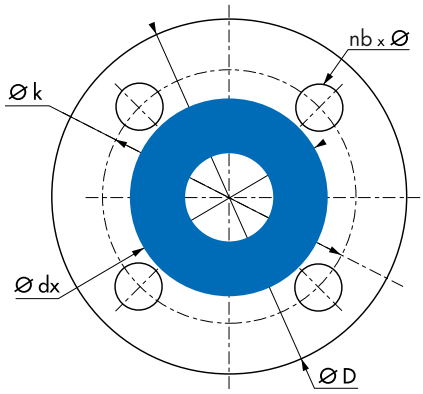
Example :	
D3V-L1234T--XW-A	DIN, PN 16, vacuum range, 1234 mm straight lenght, DN 200, inox steel, welding neck, earthing lug.
D1--C45--P-1 :	DIN, PN 10, 45° elbow, DN 80, 1 BT
D2--TE---N	DIN, PN 20, equal tee, DN 50
D1--RC---QP	DIN, PN 10, DN 100x80 concentric reduced

DIN PN 10 FLANGES AND TUBES❖

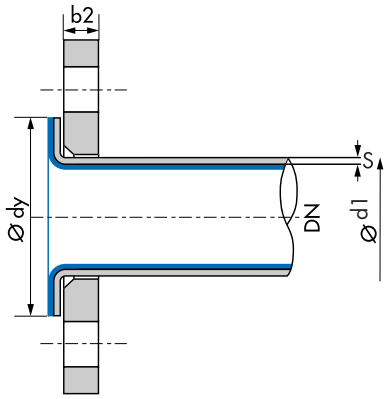
												steel tubes	
DN	D	dx*	dy	k	b1	b2	b3	b4	holes			d1	s
	mm	mm	mm	mm	mm	mm	mm	mm	nb	x Ø		mm	mm
15	95	45	45	65	14	14	14	10	4	14	M12	26.9	2.3
20	105	58	55	75	16	14	16	12	4	14	M12	26.9	2.3
25	115	68	55	85	16	16	16	12	4	14	M12	33.7	2.6
32	140	78	67	100	16	16	16	12	4	18	M16	42.4	2.6
40	150	88	80	110	16	16	16	12	4	18	M16	48.3	2.6
50	165	102	95	125	18	16	18	14	4	18	M16	60.3	2.9
65	185	122	118	145	18	16	18	14	4	18	M16	76.1	2.9
80	200	138	130	160	20	18	20	16	8	18	M16	88.9	3.2
100	220	158	158	180	20	18	20	16	8	18	M16	114.3	3.6
125	250	188	188	210	22	18	22	18	8	18	M16	139.7	4.0
150	285	212	212	240	22	18	22	18	8	22	M20	168.3	4.5
200	340	268	268	295	24	20	24	20	8	22	M20	219.1	6.3
250	395	320	320	350	26	22	26	22	12	22	M20	273.0	6.3
300	445	370	370	400	26	26	26	22	12	22	M20	323.9	7.1
350	505	430	430	460	26	28	28	22	16	22	M20	355.6	8.0
400	565	482		515	26	32	32	24	16	26	M24	406.4	8.5
450	615	532		565	/	/	38	24	20	26	M24	457.2	9.5
500	670	585		620	28	38	38	26	20	26	M24	508.0	9.5
600	780	685		725	28	44	40	26	20	30	M27	609.6	9.5

* Tolerance -5%

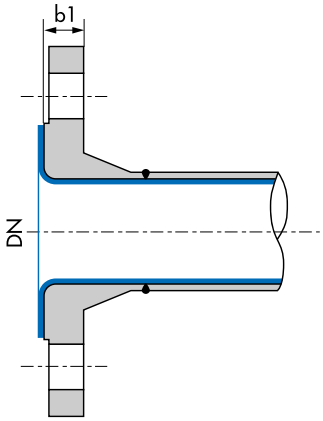
FLANGE (front view)



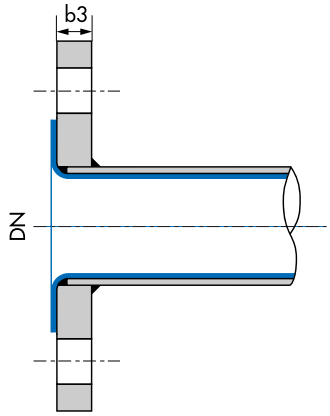
FLARED STUB END TYPE C



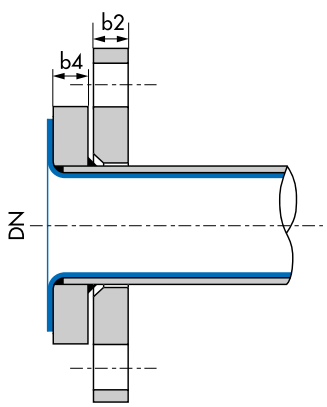
DIN 2632 WELDING NECK TYPE W



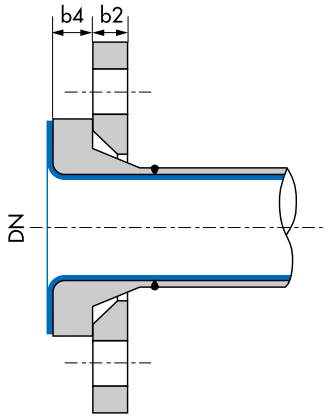
DIN 2576 SLIP-ON TYPE P



DIN 2642 COLLAR + SLIP ON TYPE P



DIN 2673 COLLAR + SLIP ON TYPE W



❖ PN 6/16/20/25... on request

STRAIGHT LENGTHS

DN	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
15	85	6000	1.8	1.4	D 1 - - L x x x x H
20	85	6000	1.8	1.9	D 1 - - L x x x x J
25	85	6000	2.8	2.5	D 1 - - L x x x x K
32	85	6000	3.2	3.7	D 1 - - L x x x x L
40	90	6000	3.9	4.2	D 1 - - L x x x x M
50	100	6000	5.3	5.5	D 1 - - L x x x x N
65	100	6000	6.7	6.7	D 1 - - L x x x x O
80	110	6000	9.2	8.4	D 1 - - L x x x x P
100	120	6000	12	10	D 1 - - L x x x x Q
125	120	6000	16	13	D 1 - - L x x x x R
150	120	6000	21	16	D 1 - - L x x x x S
200	130	6000	41	23	D 1 - - L x x x x T
250	150	6000	56	31	D 1 - - L x x x x U
300	150	6000*	63	38	D 1 - - L x x x x V
350	150	3000	78	51	D 1 - - L x x x x W
400	150	3000	97	65	D 1 - - L x x x x X
450	150	1500	104	85	D 1 - - L x x x x Y
500	160	1500	133	90	D 1 - - L x x x x Z
600	180	1500	161	134	D 1 - - L x x x x B

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

LINING

> **VIRGIN PTFE :**
DN 15 - DN 600

> **ANTI STATIC PTFE :**
DN 15 - DN 400 : C4 = A

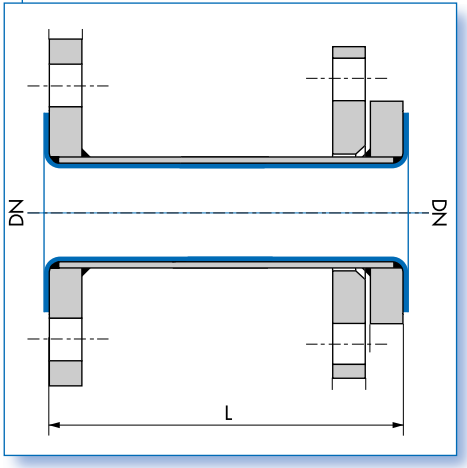
Range and thickness Page 5

Calculation of a straight length's :
Ex : DN 25, length 6 meters
6x (weight per meter) + Flange pair weight = 6 x 2,8 + 2,5 = 19,3 kg

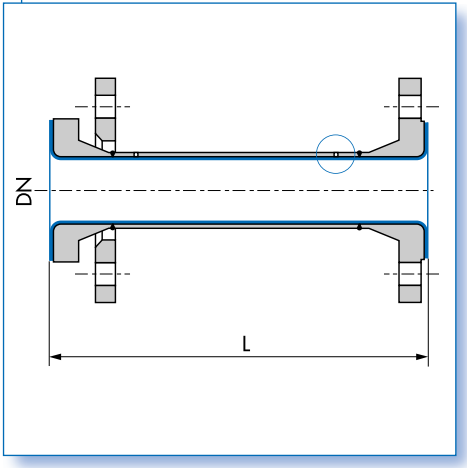
Standard construction : Type C : 3PCL standard DN 15 à DN 350
Type P : superior standard to DN 350

On request : Type W : C14 = W
Type P : DN 15 to DN 350 : C14 = P

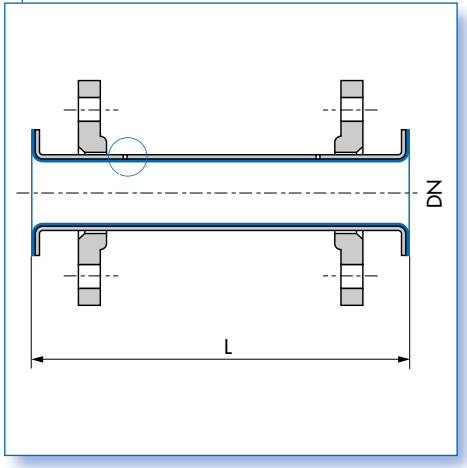
FIXED FLANGE/LOOSE FLANGE TYPE P CONSTRUCTION



FIXED FLANGE/LOOSE FLANGE TYPE W CONSTRUCTION



LOOSE FLANGE TYPE C CONSTRUCTION



DN	L (mm)	L (mm)	L (mm)	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 16
15	85	59			1.7	1.5	1.6	1.5	D 1 - - C • • - - H
20	95	65	75	70	2.1	2.2	2.2	2.1	D 1 - - C • • - - J
25	▲ 110	70	80	60	2.9	2.6	2.7	2.6	D 1 - - C • • - - K
32	130	80	95	65	4.2	3.9	4.0	3.8	D 1 - - C • • - - L
40	▲ 150	90	110	75	4.9	4.5	4.6	4.3	D 1 - - C • • - - M
50	▲ 120	80	90	65	6.3	5.8	5.9	5.6	D 1 - - C • • - - N
65	140	85	100	70	8.1	7.2	7.5	6.9	D 1 - - C • • - - O
80	▲ 165	100	120	80	10	9.3	9.7	8.9	D 1 - - C • • - - P
100	▲ 205	115	140	95	13	11	11	10	D 1 - - C • • - - Q
125	245	135	170	110	19	15	16	14	D 1 - - C • • - - R
150	▲ 285	150	190	120	25	20	21	18	D 1 - - C • • - - S
200	365	190	240	145	45	33	37	28	D 1 - - C • • - - T
250	450	225	285	165	65	46	52	39	D 1 - - C • • - - U
300	525	260	330	185	89	60	69	50	D 1 - - C • • - - V
350	600	290	375	210	126	86	120	74	D 1 - - C • • - - W
400	680	325	425	235	175	119	160	102	D 1 - - C • • - - X
450	680	350	415	205	179	139	169	125	D 1 - - C • • - - Y
500	830*	390	795*	275	376	188	230	162	D 1 - - C • • - - Z
600	974**	412	950**	325	567	292	550	212	D 1 - - C • • - - B

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

• Angle in degree : 90, 45, 60 ou 30

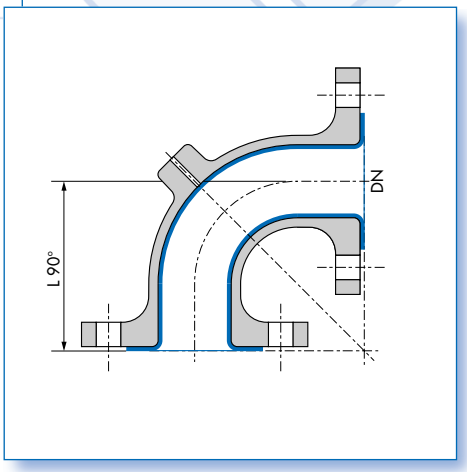
LININGS

> **PTFE :** DN 15 - DN 600

> **ANTI STATIC PTFE :** DN 15 - DN 400 : C4 = A

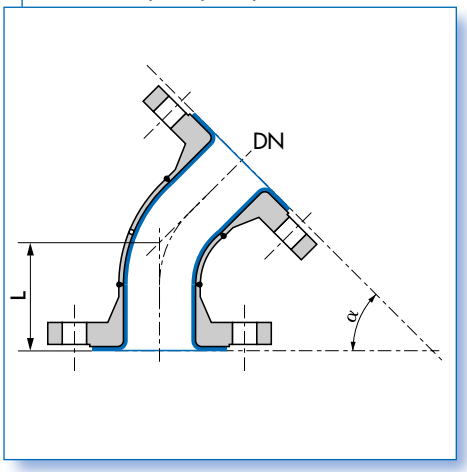
Range and thickness Page 5

DUCTILE IRON ELBOW



STANDARD FIXED FLANGES ELBOW

α = 90°/60°/45°/30°



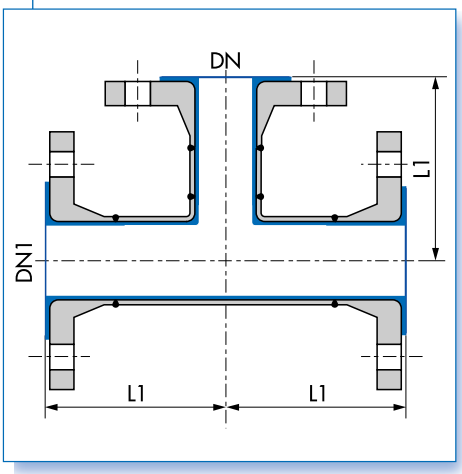
The 30° et 60° elbows proposed by Carbone Lorraine are not included in the DIN 2848 standard

Standard construction : Type P : DN 15 to DN 50
Type W : superior DN

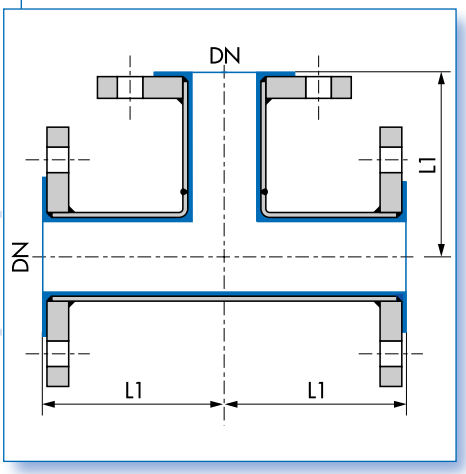
On request :
- 1 fixed flange + 1 loose flange : C12 = 1
- 2 loose flanges : C12 = 2
- ductile iron elbow : C13 = F

EQUAL TEES

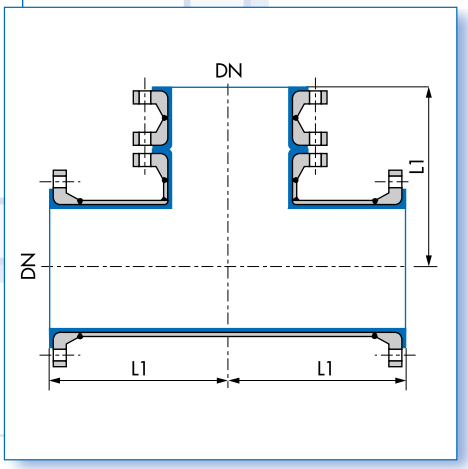
FIXED FLANGES TEE TYPE W



FIXED FLANGES TEE TYPE P



* ISO FIXED FLANGE TYPE W



DN	L1	Weight	Reference
	mm	Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
15	85	2.6	D 1 - - T E - - - H
20	95	3.6	D 1 - - T E - - - J
▲ 25	110	4.5	D 1 - - T E - - - K
32	130	6.6	D 1 - - T E - - - L
▲ 40	150	7.7	D 1 - - T E - - - M
▲ 50	120	9.7	D 1 - - T E - - - N
65	140	12	D 1 - - T E - - - O
▲ 80	165	16	D 1 - - T E - - - P
100	205	20	D 1 - - T E - - - Q
125	245	30	D 1 - - T E - - - R
150	285	40	D 1 - - T E - - - S
200	365	74	D 1 - - T E - - - T
250*	450	120	D 1 - - T E - - - U
300*	525	162	D 1 - - T E - - - V
350**	600	231	D 1 - - T E - - - W
400**	680	320	D 1 - - T E - - - X
450**	680	385	D 1 - - T E - - - Y
500**	830	473	D 1 - - T E - - - Z
600**	830	552	D 1 - - T E - - - B

▲ Ductile iron parts available

LININGS

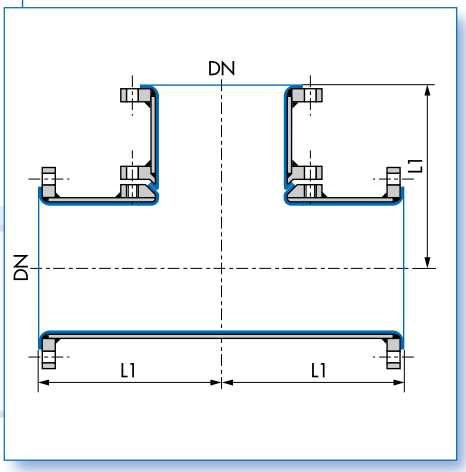
> **PFA :** DN 15 - DN 80
> **ANTI STATIC PFA :** DN 15 - DN 80 : C4 = A
> **PTFE :** DN 100 - DN 600
> **ANTI STATIC PTFE :** DN 100 - DN 400 : C4 = A

Range and thickness Page 5

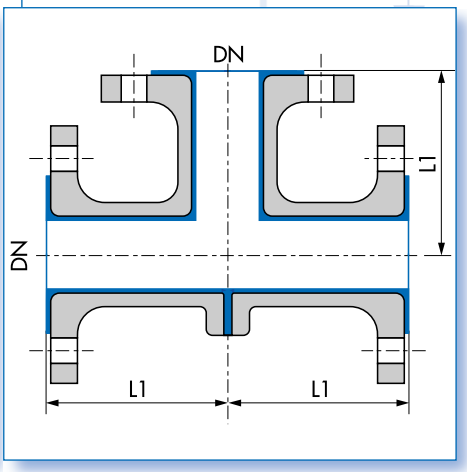
Standard constrction : Type P : DN 15 to DN 80 and DN 350 to DN 600
Type W : DN 100 to DN 300

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

** INJECTED FIXED FLANGES TEE TYPE P



DUCTILE IRON TEE ▲



DN1	DN2	L1	L2	Weight	Reference
		mm	mm	Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
20	15	95	85	3.2	D 1 - - T R - - - J H
25	15	110	85	3.8	D 1 - - T R - - - K H
	20	110	95	4.1	D 1 - - T R - - - K J
32	15	130	85	5.3	D 1 - - T R - - - L H
	20	130	95	5.6	D 1 - - T R - - - L J
	25	130	110	5.9	D 1 - - T R - - - L K
40	15	150	85	6.0	D 1 - - T R - - - M H
	20	150	95	6.4	D 1 - - T R - - - M J
	25	150	110	6.7	D 1 - - T R - - - M K
	32	150	130	7.4	D 1 - - T R - - - M L
50	15	120	85	7.4	D 1 - - T R - - - N H
	20	120	95	7.8	D 1 - - T R - - - N J
	25	120	110	8.0	D 1 - - T R - - - N K
	32	120	130	8.7	D 1 - - T R - - - N L
	40	120	150	9.1	D 1 - - T R - - - N M
65	25	140	110	9.9	D 1 - - T R - - - O K
	32	140	130	10	D 1 - - T R - - - O L
	40	140	150	11	D 1 - - T R - - - O M
	50	140	120	11	D 1 - - T R - - - O N
80	25	165	110	12	D 1 - - T R - - - P K
	32	165	130	13	D 1 - - T R - - - P L
	40	165	150	13	D 1 - - T R - - - P M
	50	165	120	14	D 1 - - T R - - - P N
	65	165	140	15	D 1 - - T R - - - P O

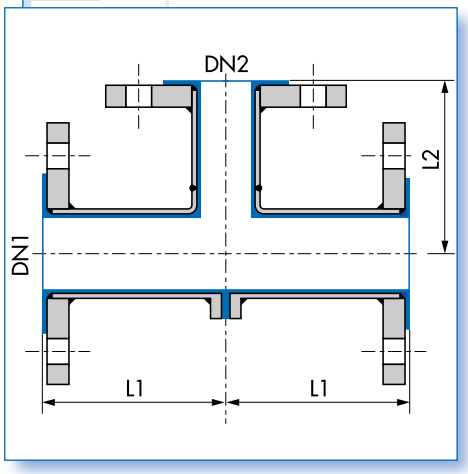
Standard construction : Type P : Fixed flanges
On request : - 3 loose flanges : C12 = 3

LININGS

> **PFA :** DN 20 - DN 80
> **ANTI STATIC PFA :** DN 20 - DN 80 : C4 = A

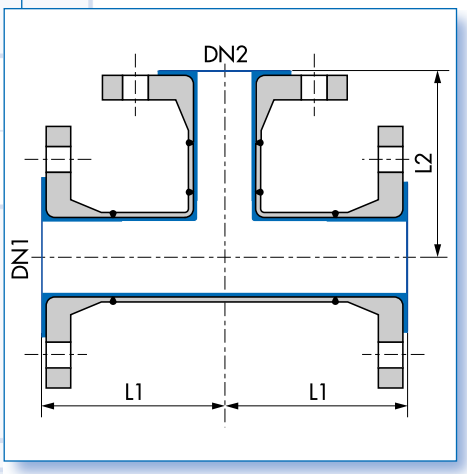
Range and thickness Page 5

FIXED FLANGES REDUCING TEE TYPE P

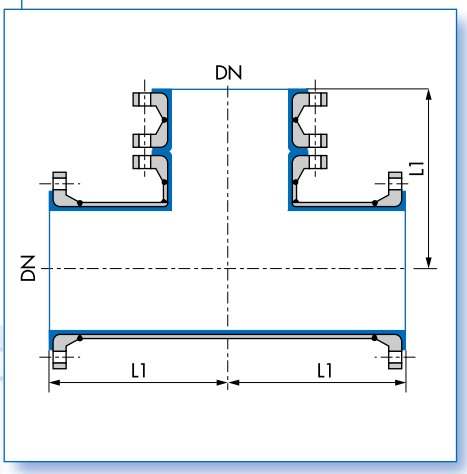


REDUCING TEES

FIXED FLANGES REDUCING TEE TYPE W



ISO FIXED FLANGES REDUCING TEE TYPE W



DN1	DN2	L1 mm	L2 mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
100	40	205	150	16	D 1 - - T R - - - Q M
	50	205	120	17	D 1 - - T R - - - Q N
	65	205	140	18	D 1 - - T R - - - Q O
	80	205	165	19	D 1 - - T R - - - Q P
125	40	245	150	23	D 1 - - T R - - - R M
	50	245	120	23	D 1 - - T R - - - R N
	65	245	140	24	D 1 - - T R - - - R O
	80	245	165	25	D 1 - - T R - - - R P
	100	245	205	27	D 1 - - T R - - - R R
150	40	285	150	30	D 1 - - T R - - - S M
	50	285	120	31	D 1 - - T R - - - S N
	65	285	140	32	D 1 - - T R - - - S O
	80	285	165	33	D 1 - - T R - - - S P
	100	285	205	34	D 1 - - T R - - - S Q
	125	285	245	37	D 1 - - T R - - - S R
200	80	365	165	57	D 1 - - T R - - - T P
	100	365	205	58	D 1 - - T R - - - T Q
	125	365	245	60	D 1 - - T R - - - T R
	150	365	285	64	D 1 - - T R - - - T S
250	100	450	205	81	D 1 - - T R - - - U Q
	125	450	245	84	D 1 - - T R - - - U R
	150	450	285	87	D 1 - - T R - - - U S
	200	450	365	96	D 1 - - T R - - - U V
300	100	525	205	113	D 1 - - T R - - - V Q
	150	525	285	116	D 1 - - T R - - - V S
	200	525	365	125	D 1 - - T R - - - V V
	250*	525	450	148	D 1 - - T R - - - V U
350	100	600	205	156	D 1 - - T R - - - W Q
	150	600	285	159	D 1 - - T R - - - W S
	200*	600	365	178	D 1 - - T R - - - W V
	250*	600	450	191	D 1 - - T R - - - W U
	300*	600	525	205	D 1 - - T R - - - W V

2 parts construction

LININGS

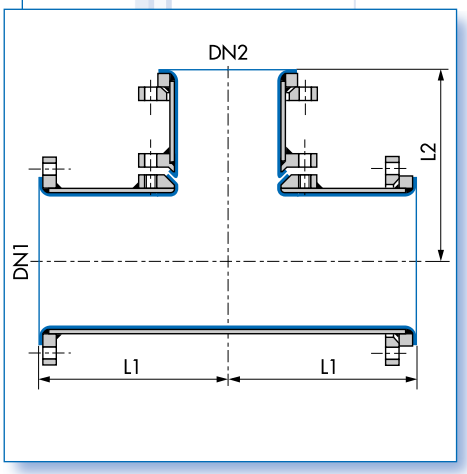
> **VIRGIN PTFE :** DN 100-DN 350
> **ANTI STATIC PTFE :** DN 100 - DN 350 : C4 = A

Range and thickness Page 5

Standard construction : Type W : Fixed flanges
On request : - 3 loose flanges : C12 = 3

DN1	DN2	L1 mm	L2 mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
400	200	680	365	234	D 1 - - T R - - - X V
	250	600	450	247	D 1 - - T R - - - X U
	300	680	525	261	D 1 - - T R - - - X V
	350	680	600	287	D 1 - - T R - - - X X
450	300	680	525	324	D 1 - - T R - - - Y V
	350	680	600	357	D 1 - - T R - - - Y W
500	200	830	365	258	D 1 - - T R - - - Z V
	250	830	450	270	D 1 - - T R - - - Z U
	300	830	525	282	D 1 - - T R - - - Z V
	350	830	600	308	D 1 - - T R - - - Z W
	400	830	680	340	D 1 - - T R - - - Z X
	450	830	680	368	D 1 - - T R - - - Z Y
600	250	830	450	412	D 1 - - T R - - - B U
	300	830	525	425	D 1 - - T R - - - B V
	350	830	600	440	D 1 - - T R - - - B W
	400	830	680	465	D 1 - - T R - - - B X
	450	830	830	495	D 1 - - T R - - - B Y
	500	830	830	525	D 1 - - T R - - - B Z

FIXED FLANGES REDUCING TEE TYPE P



Standard construction : Type P : Fixed flanges
On request : 3 loose flanges : C12 = 3

LININGS

> **PTFE :** DN 400 TO 600
> **ANTI STATIC PTFE :** DN 400 : C4 = A

Range and thickness Page 5

CONCENTRIC & ECCENTRIC REDUCERS

DN1	DN2	L mm	E mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
20	(15)	115		1.9	D 1 - - R C - - - J H
25	15	120	3.4	2.2	D 1 - - R • - - - K H
	20	125	3.4	2.5	D 1 - - R • - - - K J
32	(15)	130		2.8	D 1 - - R C - - - L H
	20	130	7.5	3.1	D 1 - - R • - - - L J
	25	130	4.0	3.4	D 1 - - R • - - - L K
40	15	130	10	3.1	D 1 - - R • - - - M
	20	145	10	3.4	D 1 - - R • - - - M J
	25	145	7.0	3.7	D 1 - - R • - - - M K
	32	150	3.0	4.3	D 1 - - R • - - - M L
50	25	160	13	4.5	D 1 - - R • - - - N K
	32	165	8.7	5.1	D 1 - - R • - - - N L
	40	165	5.7	5.4	D 1 - - R • - - - N M
65	25	180	21	5.3	D 1 - - R • - - - O K
	32	180	17	5.9	D 1 - - R • - - - O L
	40	180	14	6.2	D 1 - - R • - - - O M
	50	185	7.9	7.1	D 1 - - R • - - - O N
80	(25)	185		6.3	D 1 - - R C - - - P K
	(32)	185		7.0	D 1 - - R C - - - P L
	40	185	20	7.3	D 1 - - R • - - - P M
	50	190	14	8.1	D 1 - - R • - - - P N
	65	190	6.1	8.8	D 1 - - R • - - - P O
100	40	200	32	8.2	D 1 - - R • - - - Q M
	50	200	26	8.9	D 1 - - R • - - - Q N
	65	200	19	9.7	D 1 - - R • - - - Q O
	80	205	13	10	D 1 - - R • - - - Q P
125	65	230	31	12	D 1 - - R • - - - R O
	80	235	25	13	D 1 - - R • - - - R P
	100	235	12	14	D 1 - - R • - - - R Q

DN1	DN2	L mm	E mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
150	(50)	250		14	D 1 - - R C - - - S N
	80	250	40	15	D 1 - - R • - - - S P
	100	250	26	16	D 1 - - R • - - - S Q
	125	250	14	18	D 1 - - R • - - - S R
200	100	270	52	22	D 1 - - R • - - - T Q
	125	270	40	24	D 1 - - R • - - - T R
	150	270	25	26	D 1 - - R • - - - T S
250	(100)	305		28	D 1 - - R C - - - U Q
	125	305	67	30	D 1 - - R • - - - U R
	150	305	52	32	D 1 - - R • - - - U S
	200	310	27	38	D 1 - - R • - - - U T
300	150	330	78	29	D 1 - - R • - - - V S
	200	335	52	44	D 1 - - R • - - - V T
	250	340	25	50	D 1 - - R • - - - V U
350	200	465	68	63	D 1 - - R • - - - W T
	250	465	41	69	D 1 - - R • - - - W U
	300	465	14	74	D 1 - - R • - - - W V
400	250	495	64	84	D 1 - - R • - - - X U
	300	495	39	90	D 1 - - R • - - - X V
	350	495	25	102	D 1 - - R • - - - X W
450	300	495	64	101	D 1 - - R • - - - Y V
	350	495	49	112	D 1 - - R • - - - Y W
	400	495	24	125	D 1 - - R • - - - Y X
500	400	650	49	135	D 1 - - R • - - - Z X
	450	650	24	146	D 1 - - R • - - - Z Y
600	(500)	720		270	D 1 - - R C - - - B Z

( ) Dimension not available in eccentric reducer

• = C : Concentric Reducer
= E : Eccentric Reducer

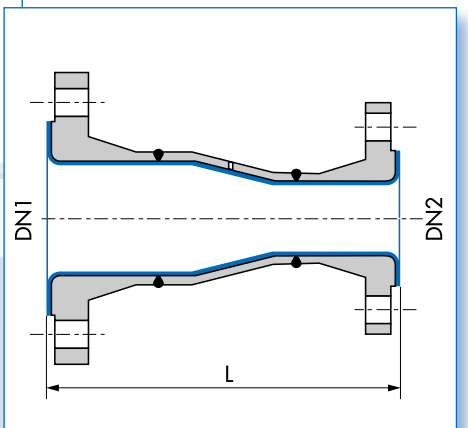
LININGS

> **PTFE :** DN 20 - DN 600
> **ANTI STATIC PTFE :** DN 20 - DN 400 : C4 = A

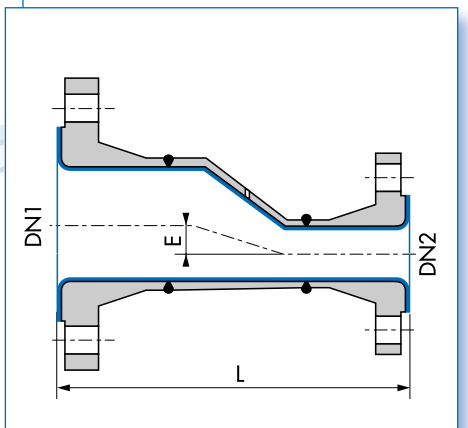
Range and thickness Page 5

Standard construction : Type W : Fixed flanges
On request : - 1 fixed flange/1 loose flange : C12 = 1

CONCENTRIC REDUCER TYPE W



ECCENTRIC REDUCER TYPE W



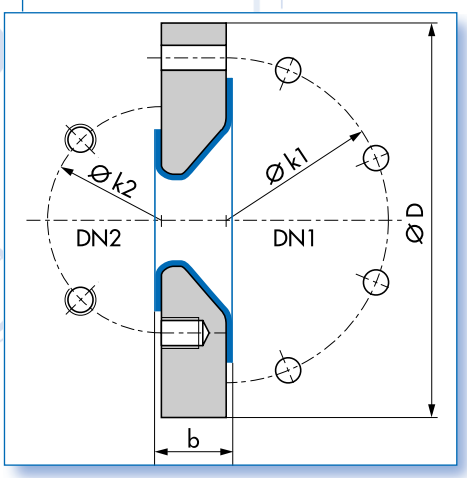
DN1	DN2	ØD mm	b mm	DN1 Ø k1 mm	DN1 Holes nb	DN1 Holes Ø	DN1 Holes	DN2 Ø k2 mm	DN2 Holes nb	DN2 Holes	Type	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
20	**15**	105	35	75	4 x		M12	65	4 x	M12	C	1.9	D 1 - - B R - - - J H
25	**15**	115	35	85	4 x		M12	65	4 x	M12	C	2.1	D 1 - - B R - - - K H
	20	115	35	85	4 x		M12	75	4 x	M12	C	2.0	D 1 - - B R - - - K J
32	**15**	140	35	100	4 x		M16	65	4 x	M12	C	3.3	D 1 - - B R - - - L H
	20	140	35	100	4 x		M16	75	4 x	M12	C	3.2	D 1 - - B R - - - L J
	25	140	35	100	4 x		M16	85	4 x	M12	C	3.1	D 1 - - B R - - - L K
40	**15**	150	35	110	4 x		M16	65	4 x	M12	B	4.1	D 1 - - B R - - - M H
	20	150	35	110	4 x		M16	75	4 x	M12	B	4.0	D 1 - - B R - - - M J
	25	150	35	110	4 x		M16	85	4 x	M12	C	3.9	D 1 - - B R - - - M K
	32	150	35	110	4 x		M16	100	4 x	M16	C	3.8	D 1 - - B R - - - M L
50	**15**	165	35	125	4 x		M16	65	4 x	M12	B	4.8	D 1 - - B R - - - N H
	20	165	35	125	4 x		M16	75	4 x	M12	B	4.8	D 1 - - B R - - - N J
	25	165	35	125	4 x		M16	85	4 x	M12	B	4.7	D 1 - - B R - - - N K
	32	165	35	125	4 x		M16	100	4 x	M12	C	4.6	D 1 - - B R - - - N L
	40	165	35	125	4 x		M16	110	4 x	M16	C	4.5	D 1 - - B R - - - N M
65	**20**	185	35	145	4 x		M16	75	4 x	M12	B	5.8	D 1 - - B R - - - O J
	25	185	35	145	4 x		M16	85	4 x	M12	B	5.7	D 1 - - B R - - - O K
	32	185	35	145	4 x		M16	100	4 x	M16	B	5.6	D 1 - - B R - - - O L
	40	185	35	145	4 x		M16	110	4 x	M16	C	5.4	D 1 - - B R - - - O M
	50	185	35	145	4 x		M16	125	4 x	M16	C	5.3	D 1 - - B R - - - O N
80	**15**	200	35	160	8 x	18		65	4 x	M12	A	6.7	D 1 - - B R - - - P H
	20	200	35	160	8 x	18		75	4 x	M12	A	6.6	D 1 - - B R - - - P J
	25	200	35	160	8 x	18		85	4 x	M12	A	6.5	D 1 - - B R - - - P K
	32	200	35	160	8 x		M16	100	4 x	M16	B	6.4	D 1 - - B R - - - P L
	40	200	35	160	8 x		M16	110	4 x	M16	B	6.2	D 1 - - B R - - - P M
	50	200	35	160	8 x		M16	125	4 x	M16	B	6.0	D 1 - - B R - - - P N
	65	200	35	160	8 x		M16	145	4 x	M16	B	5.7	D 1 - - B R - - - P O

LININGS

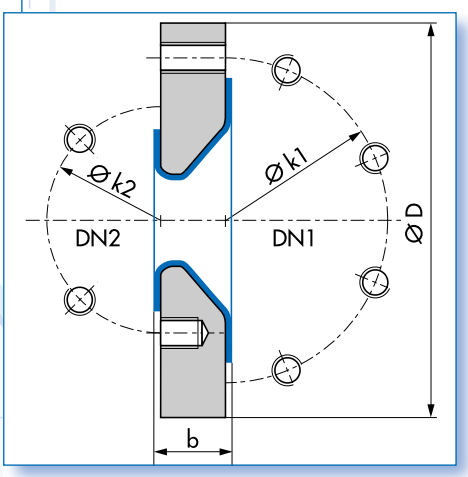
> **PTFE :** DN 20 - DN 80
> **ANTI STATIC PTFE :** DN 20 - DN 80 : C4 = A

Range and thickness Page 5

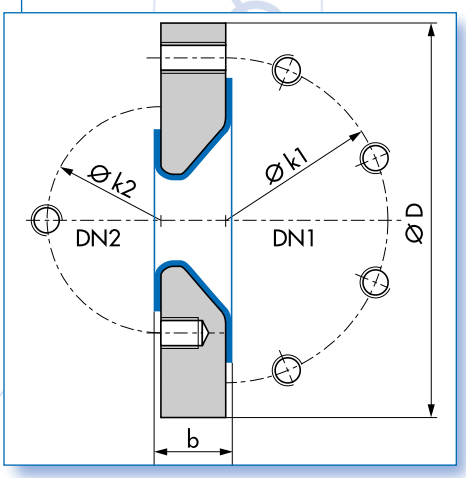
TAPPED HOLE/THROUGH HOLE TYPE A



TAPPED HOLES TYPE B



TAPPED HOLES ON CENTER-LINE/OFF CENTER-LINE TYPE C



REDUCING FLANGES

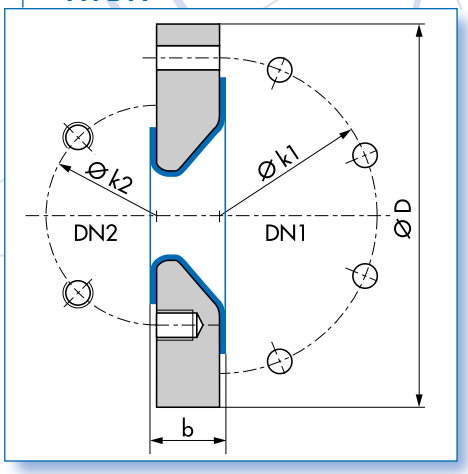
				DN1				DN2					Reference
DN1	DN2	ØD	b	Ø k1	Holes			Ø k2	Holes		Type	Weight	
		mm	mm	mm	nb	Ø	UNC	mm	nb	UNC		Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
100	**15**	220	45	180	8 x	18		65	4 x	M12	A	11	D 1 - - B R - - - Q H
	20	220	45	180	8 x	18		75	4 x	M12	A	11	D 1 - - B R - - - Q J
	25	220	45	180	8 x	18		85	4 x	M12	A	11	D 1 - - B R - - - Q K
	32	220	45	180	8 x	18		100	4 x	M16	A	11	D 1 - - B R - - - Q L
	40	220	45	180	8 x	18		110	4 x	M16	A	11	D 1 - - B R - - - Q M
	50	220	45	180	8 x		M16	125	4 x	M16	B	10	D 1 - - B R - - - Q N
	65	220	45	180	8 x		M16	145	4 x	M16	B	10	D 1 - - B R - - - Q O
	80	220	45	180	8 x		M16	160	8 x	M12	C	10	D 1 - - B R - - - Q P
125	**32**	250	45	210	8 x	18		100	4 x	M16	A	13	D 1 - - B R - - - R L
	40	250	45	210	8 x	18		110	4 x	M16	A	13	D 1 - - B R - - - R M
	50	250	45	210	8 x	18		125	4 x	M16	A	12	D 1 - - B R - - - R N
	65	250	45	210	8 x		M16	145	4 x	M16	B	12	D 1 - - B R - - - R O
	80	250	45	210	8 x		M16	160	8 x	M16	B	12	D 1 - - B R - - - R P
	100	250	45	210	8 x		M16	180	8 x	M16	C	12	D 1 - - B R - - - R Q
150	**25**	285	45	240	8 x	22		85	4 x	M12		17	D 1 - - B R - - - S K
	32	285	45	240	8 x	22		100	4 x	M16	A	17	D 1 - - B R - - - S L
	40	285	45	240	8 x	22		110	4 x	M16	A	17	D 1 - - B R - - - S M
	50	285	45	240	8 x	22		125	4 x	M16	A	17	D 1 - - B R - - - S N
	65	285	45	240	8 x	22		145	4 x	M16	A	17	D 1 - - B R - - - S O
	80	285	45	240	8 x	22		160	8 x	M16	A	16	D 1 - - B R - - - S P
	100	285	45	240	8 x		M20	180	8 x	M16	B	15	D 1 - - B R - - - S Q
	125	285	45	240	8 x		M20	210	8 x	M20	B	14	D 1 - - B R - - - S R
200	**25**	340	45	295	8 x	22		85	4 x	M12	C	25	D 1 - - B R - - - T K
	32	340	45	295	8 x	22		100	4 x	M16	A	25	D 1 - - B R - - - T L
	40	340	45	295	8 x	22		110	4 x	M16	A	25	D 1 - - B R - - - T M
	50	340	45	295	8 x	22		125	4 x	M16	A	25	D 1 - - B R - - - T N
	65	340	45	295	8 x	22		145	4 x	M16	A	25	D 1 - - B R - - - T O
	80	340	45	295	8 x	22		160	8 x	M16	A	24	D 1 - - B R - - - T P
	100	340	45	295	8 x	22		180	8 x	M16	A	23	D 1 - - B R - - - T Q
	125	340	45	295	8 x	22		210	8 x	M20	B	22	D 1 - - B R - - - T R
	150	340	45	295	8 x		M20	240	8 x	M20	B	20	D 1 - - B R - - - T S
250	**40**	395	45	350	12 x	22		110	4 x	M16	A	34	D 1 - - B R - - - U M
	50	395	45	350	12 x	22		125	4 x	M16	A	34	D 1 - - B R - - - U N
	65	395	45	350	12 x	22		145	4 x	M16	A	34	D 1 - - B R - - - U O
	80	395	45	350	12 x	22		160	8 x	M16	A	33	D 1 - - B R - - - U P

LININGS

> **PTFE :** DN 100 - DN 250
> **ANTI STATIC PTFE :** DN 100 - DN 250 : C4 = A

Range and thickness Page 5

TAPPED HOLE / THROUGH HOLE TYPE A



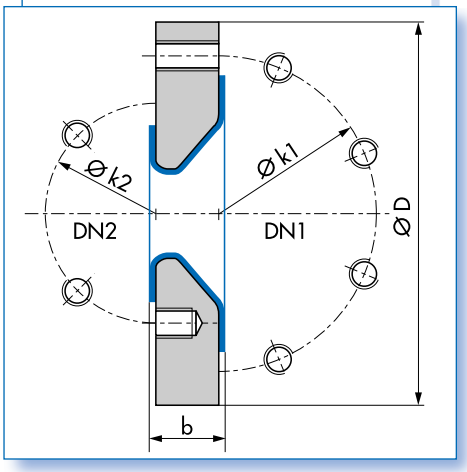
DN1	DN2	ØD	b	DN1 Ø k1	DN1 Holes nb	DN1 Holes Ø	DN1 Holes	DN2 Ø k2	DN2 Holes nb	DN2 Holes	Type	Weight	Reference
		mm	mm	mm	nb	Ø		mm	nb			(Kg)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
250	**100**	395	45	350	12 x	22		180	8 x	M16	A	33	D 1 - - B R - - - U Q
	125	395	45	350	12 x	22		210	8 x	M20	A	32	D 1 - - B R - - - U R
	150	395	45	350	12 x	22		240	8 x	M20	A	30	D 1 - - B R - - - U S
	200	395	45	350	12 x		M20	295	8 x	M20	B	27	D 1 - - B R - - - U T
300	**50**	445	50	400	12 x	22		125	4 x	M16	A	55	D 1 - - B R - - - V N
	80	445	50	400	12 x	22		160	8 x	M16	A	54	D 1 - - B R - - - V P
	100	445	50	400	12 x	22		180	8 x	M16	A	54	D 1 - - B R - - - V Q
	125	445	50	400	12 x	22		210	8 x	M20	A	54	D 1 - - B R - - - V R
	150	445	50	400	12 x	22		240	8 x	M20	A	49	D 1 - - B R - - - V S
	200	445	50	400	12 x	22		295	8 x	M20	A	44	D 1 - - B R - - - V T
	250	445	50	400	12 x		M20	350	12 x	M20	C	43	D 1 - - B R - - - V U
350	**150**	505	50	460	16 x	22		240	8 x	M20	A	60	D 1 - - B R - - - W S
	200	505	50	460	16 x	22		295	8 x	M20	A	56	D 1 - - B R - - - W T
	250	505	50	460	16 x	22		350	12 x	M20	A	53	D 1 - - B R - - - W U
	300	505	50	460	16 x		M20	400	12 x	M20	B	50	D 1 - - B R - - - W V
400	**200**	565	50	515	16 x	26		295	8 x	M20	A	75	D 1 - - B R - - - X T
	250	565	50	515	16 x	26		350	12 x	M20	A	71	D 1 - - B R - - - X U
	300	565	50	515	16 x	26		400	12 x	M20	A	67	D 1 - - B R - - - X V
	350	565	50	515	16 x		M24	460	16 x	M20	B	64	D 1 - - B R - - - X W
450	**250**	615	50	565	20 x	26		350	12 x	M20	A	78	D 1 - - B R - - - Y U
	300	615	50	565	20 x	26		400	12 x	M20	A	75	D 1 - - B R - - - Y V
	350	615	50	565	20 x	26		460	16 x	M20	A	73	D 1 - - B R - - - Y W
	400	615	50	565	20 x		M24	515	16 x	M24	B	71	D 1 - - B R - - - Y X
500	**150**	670	50	620	20 x	26		240	8 x	M20	A	124	D 1 - - B R - - - Z S
	200	670	50	620	20 x	26		295	8 x	M20	A	114	D 1 - - B R - - - Z T
	250	670	50	620	20 x	26		350	12 x	M20	A	107	D 1 - - B R - - - Z U
	300	670	50	620	20 x	26		400	12 x	M20	A	98	D 1 - - B R - - - Z V
	350	670	50	620	20 x	26		460	16 x	M20	A	93	D 1 - - B R - - - Z W
	400	670	50	620	20 x	26		515	16 x	M24	A	88	D 1 - - B R - - - Z X
	450	670	50	620	20 x		M24	565	20 x	M24	C	83	D 1 - - B R - - - Z Y
600	**500**	780	50	725	20 x	30		620	20 x	M24	A	78	D 1 - - B R - - - B Z

LININGS

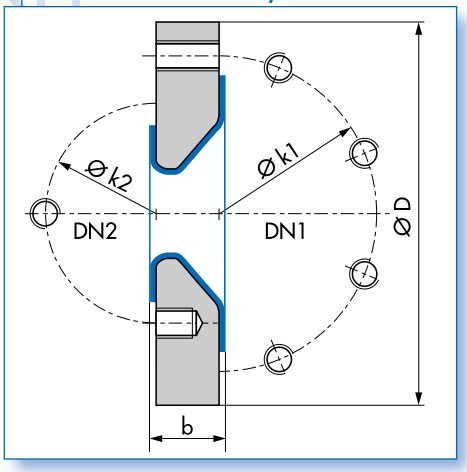
> **PTFE :** DN 250 - DN 600
> **ANTI STATIC PTFE :** DN 250 - DN 400 : C4 = A

Range and thickness Page 5

TAPPED HOLES TYPE B



TAPPED HOLES ON CENTER-LINE/OFF CENTER-LINE TYPE C



INSTRUMENT TEES

DN1	DN2	L	H	Weight	Reference
		mm	mm	kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
25	**15**	50	90	1.9	D 1 - - P I - - - K H
	20	50	90	1.9	D 1 - - P I - - - K J
	25	50	90	2.0	D 1 - - P I - - - K K
32	**15**	50	100	2.6	D 1 - - P I - - - L H
	20	50	100	2.7	D 1 - - P I - - - L J
	25	50	100	2.8	D 1 - - P I - - - L K
40	**15**	50	110	2.7	D 1 - - P I - - - M H
	20	50	110	2.8	D 1 - - P I - - - M J
	25	50	110	3.0	D 1 - - P I - - - M K
	40	75	110	4.6	D 1 - - P I - - - M M
50	**15**	50	115	4.7	D 1 - - P I - - - N H
	20	50	115	4.8	D 1 - - P I - - - N J
	25	50	115	5.0	D 1 - - P I - - - N K
	40	75	115	8.4	D 1 - - P I - - - N M
	50	90	115	9.9	D 1 - - P I - - - N N
65	**15**	50	125	5.0	D 1 - - P I - - - O H
	20	50	125	5.1	D 1 - - P I - - - O J
	25	50	125	5.5	D 1 - - P I - - - O K
	40	75	125	9.2	D 1 - - P I - - - O M
	50	90	125	11	D 1 - - P I - - - O N
80	**15**	50	135	5.7	D 1 - - P I - - - P H
	20	50	135	5.8	D 1 - - P I - - - P J
	25	50	135	6.0	D 1 - - P I - - - P K
	40*	75	135	11	D 1 - - P I - - - P M
	50*	90	135	12	D 1 - - P I - - - P N
100	**15**	50	150	6.7	D 1 - - P I - - - Q H
	20	50	150	6.8	D 1 - - P I - - - Q J
	25	50	150	7.0	D 1 - - P I - - - Q K
	40*	75	150	12	D 1 - - P I - - - Q M
	50*	90	150	13	D 1 - - P I - - - Q N
125	**25**	50	160	8.6	D 1 - - P I - - - R K
	40	75	160	13	D 1 - - P I - - - R M
125	**50**	90	160	21	D 1 - - P I - - - R N
150	**15**	50	180	8.9	D 1 - - P I - - - S H
	20	50	180	9.0	D 1 - - P I - - - S J
	25	50	180	10	D 1 - - P I - - - S K
	40	75	180	15	D 1 - - P I - - - S M
	50	90	180	16	D 1 - - P I - - - S N
200	**15**	50	210	10	D 1 - - P I - - - T H
	20	50	210	10	D 1 - - P I - - - T J
	25	50	210	10	D 1 - - P I - - - T K
	40	75	210	16	D 1 - - P I - - - T M
	50	90	210	17	D 1 - - P I - - - T N
250	**25**	50	240	24	D 1 - - P I - - - U K
	40	75	240	26	D 1 - - P I - - - U M
	50	90	240	27	D 1 - - P I - - - U N
300	**25**	90	340	26	D 1 - - P I - - - V K
	40	110	340	29	D 1 - - P I - - - V M
	50	120	340	30	D 1 - - P I - - - V N
350	**25**	90	375	41	D 1 - - P I - - - W K
	40	110	375	44	D 1 - - P I - - - W M
	50	120	375	45	D 1 - - P I - - - W N
400	**25**	90	390	46	D 1 - - P I - - - X K
	40	110	390	48	D 1 - - P I - - - X M
	50	120	390	50	D 1 - - P I - - - X N
450	**25**	90	419	51	D 1 - - P I - - - Y K
	40	110	419	54	D 1 - - P I - - - Y M
	50	120	419	55	D 1 - - P I - - - Y N
500	**25****	90	450	60	D 1 - - P I - - - Z K
	40**	110	450	63	D 1 - - P I - - - Z M
	50**	120	450	64	D 1 - - P I - - - Z N
600	**25****	90	559	69	D 1 - - P I - - - Z K
	40**	110	559	72	D 1 - - P I - - - Z M
	50**	120	559	73	D 1 - - P I - - - B N

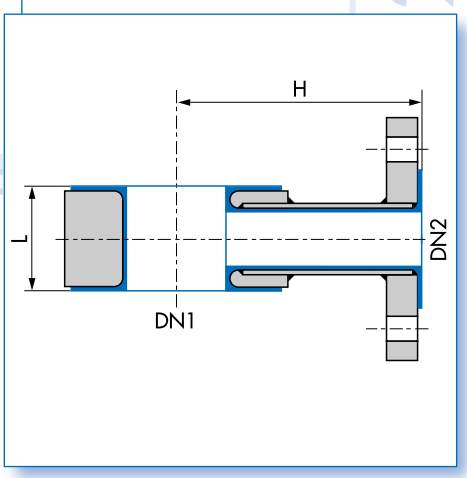
* Assembly only possible using 4 bolts ** In 2 parts

LININGS

> **PFA :** DN 25 - DN 200
> **ANTI STATIC PFA :** DN 25 - DN 200 : C4 = A
> **PTFE :** DN 250 - DN 600
> **ANTI STATIC PTFE :** DN 250 - 400 : C4 = A

Range and thickness Page 5

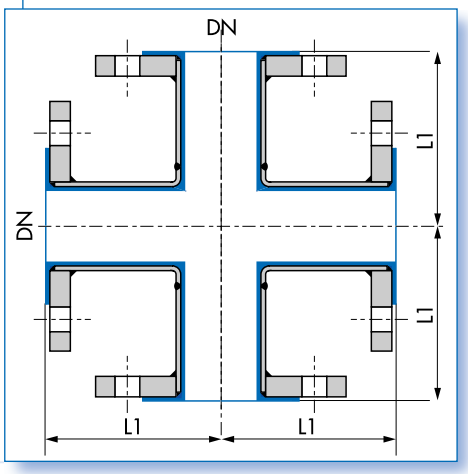
FIXED FLANGE



For dimensions ≥ DN250, length H according to NFE 29260 is also available on request

DN	L1 mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
15	85	3.4	D 1 - - x E - - - H
20	95	4.7	D 1 - - x E - - - J
25	110	5.9	D 1 - - x E - - - K
32	130	8.8	D 1 - - x E - - - L
40	150	10	D 1 - - x E - - - M
50	120	12	D 1 - - x E - - - N
65	140	16	D 1 - - x E - - - O
80	165	21	D 1 - - x E - - - P
100	205	27	D 1 - - x E - - - Q
125	245	39	D 1 - - x E - - - R
150	285	53	D 1 - - x E - - - S
200	365	116	D 1 - - x E - - - T
250*	450	165	D 1 - - x E - - - U
300*	525	219	D 1 - - x E - - - V
350*	600	315	D 1 - - x E - - - W
400*	680	435	D 1 - - x E - - - X
450**	680	525	D 1 - - x E - - - Y
500**	830	590	D 1 - - x E - - - Z
600**	830	720	D 1 - - x E - - - B

FIXED FLANGES CROSS TYPE P



Standard construction : Type P : DN 15 to DN 80 and DN 450 to DN 600
Type W : DN 100 to DN 400

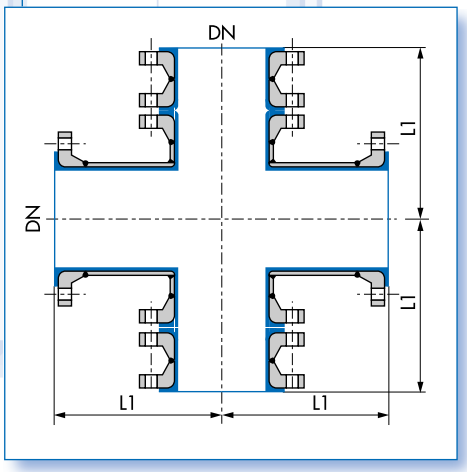
On request : - 4 loose flanges : C12 = 4

LININGS

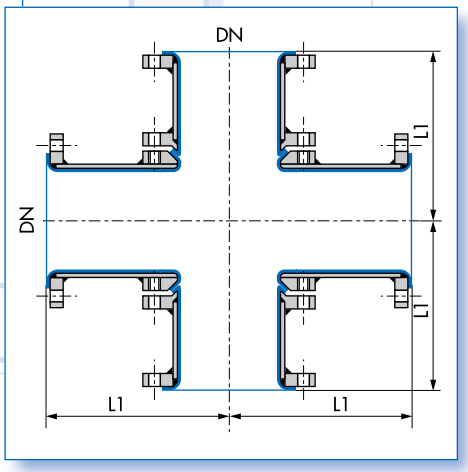
> **PFA:** DN 15 - DN 80
> **ANTI STATIC PFA :** DN 15 - DN 80 : C4 = A
> **PTFE :** DN 100 - DN 600
> **ANTI STATIC PTFE :** DN 100 - DN 400 : C4 = A

Range and thickness Page 5

* ISO FIXED FLANGES CROSS TYPE W



** INJECTED FIXED FLANGES CROSS TYPE P



Parts are not included in the DIN 2848 standard but lengths identical to those of the DIN 2848 tees

REDUCING CROSSES

DN1	DN2	L1	L2	Weight	Reference
		mm	mm	Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
20	15	95	85	4.1	D 1 - - x R - - - J H
25	15	110	85	4.7	D 1 - - x R - - - K H
	20	110	95	5.3	D 1 - - x R - - - K J
32	15	130	85	6.1	D 1 - - x R - - - L H
	20	130	95	6.8	D 1 - - x R - - - L J
	25	130	110	7.3	D 1 - - x R - - - L K
40	15	150	85	6.9	D 1 - - x R - - - M H
	20	150	95	7.5	D 1 - - x R - - - M J
	25	150	110	8.1	D 1 - - x R - - - M K
	32	150	130	9.5	D 1 - - x R - - - M L
50	15	120	85	8.2	D 1 - - x R - - - N H
	20	120	95	8.9	D 1 - - x R - - - N J
	25	120	110	9.5	D 1 - - x R - - - N K
	32	120	130	10	D 1 - - x R - - - N L
	40	120	150	11	D 1 - - x R - - - N M
65	25	140	110	11	D 1 - - x R - - - O K
	32	140	130	12	D 1 - - x R - - - O L
	40	140	150	13	D 1 - - x R - - - O M
	50	140	120	14	D 1 - - x R - - - O N
80	25	165	110	13	D 1 - - x R - - - P K
	32	165	130	15	D 1 - - x R - - - P L
	40	165	150	16	D 1 - - x R - - - P M
	50	165	120	17	D 1 - - x R - - - P N
	65	165	140	19	D 1 - - x R - - - P O

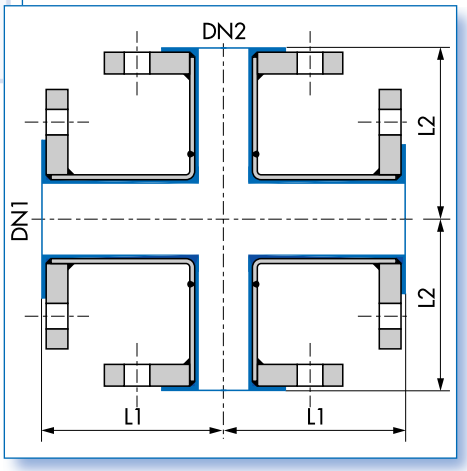
LININGS

> **PFA :** DN 20 - DN 80
> **ANTI STATIC PFA :** DN 20 - DN 80 : C4 = A

Range and thickness Page 5

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

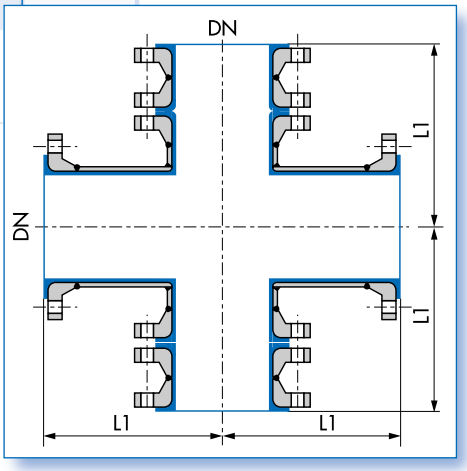
FIXED FLANGES REDUCING CROSSES TYPE P



DN1	DN2	L1	L2	Weight	Reference
		mm	mm	Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
100	40	205	150	19	D 1 - - x R - - - Q M
	50	205	120	20	D 1 - - x R - - - Q N
	65	205	140	22	D 1 - - x R - - - Q O
	80	205	165	24	D 1 - - x R - - - Q P
125	40	245	150	25	D 1 - - x R - - - R M
	50	245	120	26	D 1 - - x R - - - R N
	65	245	140	28	D 1 - - x R - - - R O
	80	245	165	30	D 1 - - x R - - - R P
	100	245	205	33	D 1 - - x R - - - R Q
150	40	285	150	33	D 1 - - x R - - - S M
	50	285	120	34	D 1 - - x R - - - S N
	65	285	140	35	D 1 - - x R - - - S O
	80	285	165	38	D 1 - - x R - - - S P
	100	285	205	40	D 1 - - x R - - - S Q
	125	285	145	46	D 1 - - x R - - - S R
200	80	365	165	82	D 1 - - x R - - - T P
	100	365	205	84	D 1 - - x R - - - T Q
	125	365	245	90	D 1 - - x R - - - T R
	150*	365	285	96	D 1 - - x R - - - T S
250	100	450	205	86	D 1 - - x R - - - U Q
	125	450	245	92	D 1 - - x R - - - U R
	150*	450	285	98	D 1 - - x R - - - U S
	200*	450	365	117	D 1 - - x R - - - U T
300	100	525	205	120	D 1 - - x R - - - V Q
	150*	525	285	126	D 1 - - x R - - - V S
	200*	525	365	144	D 1 - - x R - - - V T
	250*	525	450	191	D 1 - - x R - - - V U
350	100	600	205	163	D 1 - - x R - - - W Q
	150*	600	285	169	D 1 - - x R - - - W S
	200*	600	365	207	D 1 - - x R - - - W T
	250*	600	450	233	D 1 - - x R - - - W U
	300*	600	525	260	D 1 - - x R - - - W V

* 3 parts constrction

ISO FIXED FLANGES REDUCING CROSSES TYPE W



LININGS

> **PTFE :** DN 100 - DN 350
> **ANTI STATIC PTFE :** DN 100 - DN 350 : C4 = A

Range and thickness Page 5

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

REDUCING CROSSES

DN1	DN2	L1	L2	Weight	Reference
		mm	mm	Kg	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
400	200	680	365	262	D 1 - - x R - - - X T
	250	680	450	288	D 1 - - x R - - - X U
	300	680	525	315	D 1 - - x R - - - X V
	350	680	600	368	D 1 - - x R - - - X W
450	250	680	450	325	D 1 - - x R - - - Y U
	300	680	525	351	D 1 - - x R - - - Y V
	350	680	600	409	D 1 - - x R - - - Y W
	400	680	680	421	D 1 - - x R - - - Y X
500	200	830	365	266	D 1 - - x R - - - Z T
	250	830	450	291	D 1 - - x R - - - Z U
	300	830	525	316	D 1 - - x R - - - Z V
	350	830	600	367	D 1 - - x R - - - Z W
	400	830	680	431	D 1 - - x R - - - Z X
	450	830	680	488	D 1 - - x R - - - Z Y
600	250	830	450	510	D 1 - - x R - - - B U
	300	830	525	530	D 1 - - x R - - - B V
	350	830	600	550	D 1 - - x R - - - B W
	400	830	680	590	D 1 - - x R - - - B X
	450	830	680	610	D 1 - - x R - - - B Y
	500	830	830	690	D 1 - - x R - - - B Z

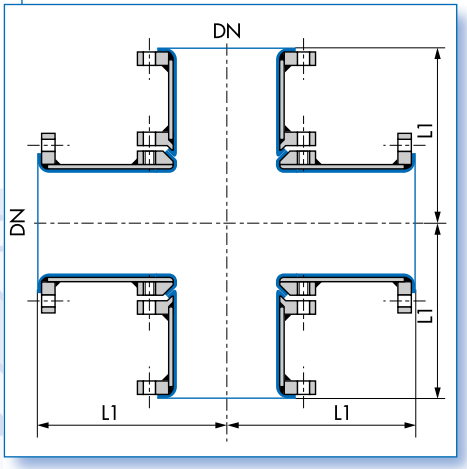
LININGS

> **PTFE :** DN 400 - DN 600
> **ANTI STATIC PTFE :** DN 400 : C4 = A

Range and thickness Page 5

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

INJECTED FIXED FLANGES REDUCING CROSS TYPE P



DN	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
15	51	20	15	50	50	85	D 1 - - • - x x x H
20	60	20	15	50	50	85	D 1 - - • - x x x J
25	70	20	15	50	50	85	D 1 - - • - x x x K
32	82	20	15	60	60	85	D 1 - - • - x x x L
40	92	20	15	60	60	90	D 1 - - • - x x x M
50	107	20	15	60	60	100	D 1 - - • - x x x N
65	127	20	15	60	60	100	D 1 - - • - x x x O
80	142	20	15	60	60	110	D 1 - - • - x x x P
100	162	20	15	60	60	113	D 1 - - • - x x x Q
125	192	20	15	60	60	117	D 1 - - • - x x x R
150	218	20	20	60	60	117	D 1 - - • - x x x S
200	273	20	20	70	70	130	D 1 - - • - x x x T
250	328	20	20	70	70	143	D 1 - - • - x x x U
300	378	20	20	70	70	143	D 1 - - • - x x x V
350	438	20	20	70	70	143	D 1 - - • - x x x W
400	488	20	20	80	80	147	D 1 - - • - x x x X
450	539	20	20	80	80	147	D 1 - - • - x x x Y
500	594	20	20	80	80	156	D 1 - - • - x x x Z
600	695	20	20	80	80	172	D 1 - - • - x x x B

• = F : Spacers shape F
• = G : Spacers shape G
• = E : Spacers shape H

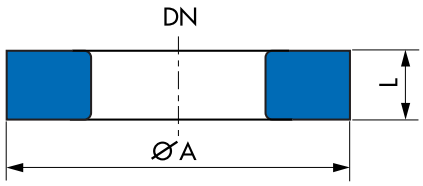
xxxx : length in mm

LININGS

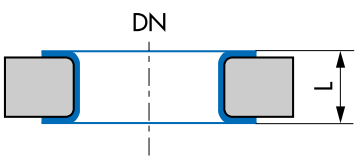
> **PTFE :** DN 15 - DN 600
> **ANTI STATIC PTFE :** DN 15 - DN 400 : C4 = A

Range and thickness Page 5

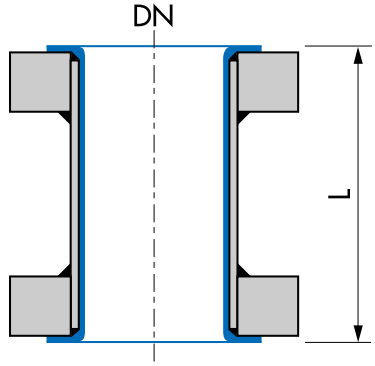
MASSIVE PTFE SPACER SHAPE F



STEEL LINED SPACER SHAPE G



TUBE LINED SPACER SHAPE H



SPECTACLE BLINDS

DN	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
20	61	75	35	16	14	1.9	D 1 - - 0 B - - - J
25	71	85	40	16	14	2.6	D 1 - - 0 B - - - K
32	82	100	50	19	14	3.9	D 1 - - 0 B - - - L
40	92	110	55	19	14	4.4	D 1 - - 0 B - - - M
50	107	125	65	19	14	5.9	D 1 - - 0 B - - - N
65	127	145	70	19	14	7.4	D 1 - - 0 B - - - O
80	142	160	40	19	14	8.5	D 1 - - 0 B - - - P
100	162	180	50	19	18	9.8	D 1 - - 0 B - - - Q
125	192	210	60	19	18	14	D 1 - - 0 B - - - R
150	218	240	65	24	18	19	D 1 - - 0 B - - - S
200	273	295	80	24	21	28	D 1 - - 0 B - - - T
250	328	350	65	24	23	39	D 1 - - 0 B - - - U
300	378	400	80	24	26	48	D 1 - - 0 B - - - V
350	438	460	65	24	28	64	D 1 - - 0 B - - - W
400	488	515	70	28	30	79	D 1 - - 0 B - - - X
450	538	565	60	28	30	94	D 1 - - 0 B - - - Y
500	593	620	70	28	33	123	D 1 - - 0 B - - - Z
600	695	725	80	32	38	191	D 1 - - 0 E - - - B

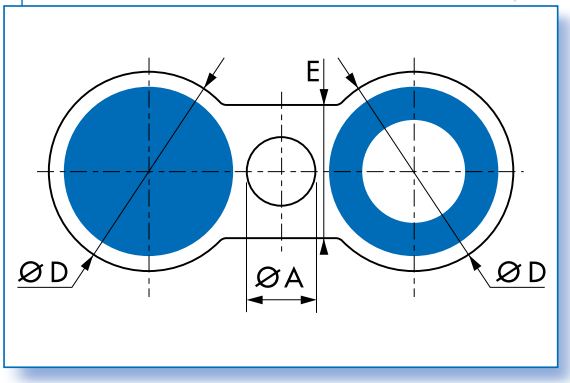
LININGS

> **PTFE :** DN 20 - DN 600
>**ANTI STATIC PTFE :** DN 20 - DN 400 : C4 = A

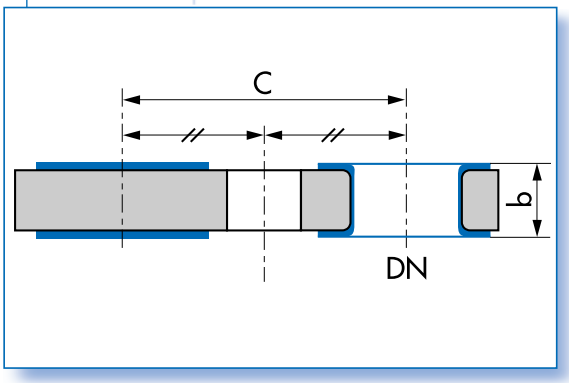
Range and thickness Page 5

ØA

SPECTACLE BLIND (front view)



SPECTACLE BLIND (sectional view)

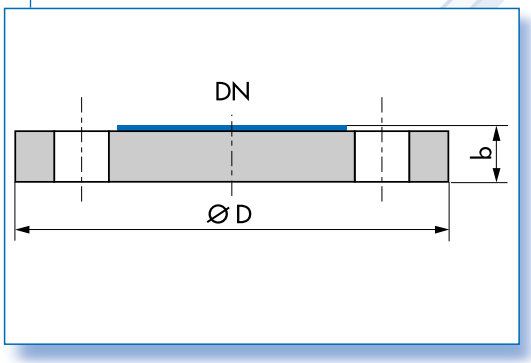


BLIND FLANGES

DN	ØD mm	b mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
15	95	18	0.7	D 1 - - B P - - - H
20	105	20	1.0	D 1 - - B P - - - J
25	115	20	1.2	D 1 - - B P - - - K
32	140	20	1.3	D 1 - - B P - - - L
40	150	20	2.1	D 1 - - B P - - - M
50	165	22	2.9	D 1 - - B P - - - N
65	185	22	3.7	D 1 - - B P - - - O
80	200	24	4.9	D 1 - - B P - - - P
100	220	24	5.8	D 1 - - B P - - - Q

DN	ØD mm	b mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
125	250	26	8.6	D 1 - - B P - - - R
150	285	26	10	D 1 - - B P - - - S
200	340	28	16	D 1 - - B P - - - T
250	395	30	24	D 1 - - B P - - - U
300	445	30	31	D 1 - - B P - - - V
350	505	30	41	D 1 - - B P - - - W
400	565	30	50	D 1 - - B P - - - X
450	615	30	65	D 1 - - B P - - - Y
500	670	31	76	D 1 - - B P - - - Z
600	780	36	132	D 1 - - B P - - - B

BLIND FLANGES



LININGS

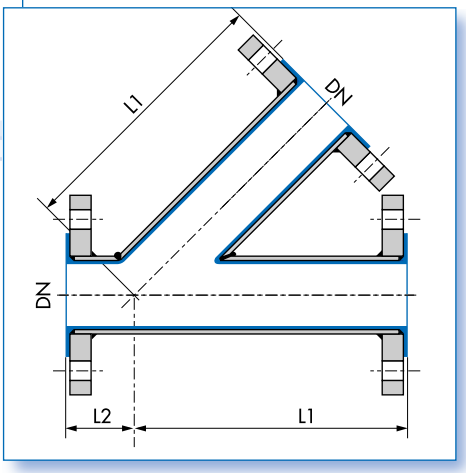
> **PTFE :** DN 15 - DN 600
> **ANTI STATIC PTFE :** DN 15 - DN 400 : C4 = A

Range and thickness Page 5

LATERAL TEES

DN	L1 mm	L2 mm	Weight Kg	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
25	146	44	6.0	D 1 - - T L - - - K
32	180	44	8.0	D 1 - - T L - - - L
40	178	51	10	D 1 - - T L - - - M
50	203	63	12	D 1 - - T L - - - N
65	241	64	17	D 1 - - T L - - - O
80	254	76	21	D 1 - - T L - - - P
100	305	76	33	D 1 - - T L - - - Q
125	343	89	28	D 1 - - T L - - - R
150	368	89	49	D 1 - - T L - - - S
200	445	114	70	D 1 T L - - T

LATERAL TEES TYPE P



Standard construction : Type P : Fixed flanges

LININGS

> **PFA :** DN 25 & DN 40-100
> **ANTI STATIC PFA :** DN 25 - DN 100 : C4 = A
> **PTFE :** DN 32, DN 65 & DN 125-200
> **ANTI STATIC PTFE :** DN 125 - DN 200 : C4 = A

Range and thickness Page 5

MANIFOLDS

DN1	DN2	H	L1
		mm	mm
25	25	110	110
32	25	110	110
	32	130	130
40	25	110	110
	32	130	130
	40	150	150
50	25	110	110
	32	130	130
	40	150	150
	50	120	120
65	25	110	110
	32	130	130
	40	150	150
	50	120	120
	65	140	140
80	25	110	110
	32	130	130
	40	150	150
	50	120	120
	65	140	140
	80	165	165

DN1	DN2	H	L1
		mm	mm
100	25	110	110
	32	130	130
	40	150	150
	50	120	120
	65	140	140
	80	165	165
	100	205	205
125	25	130	100
	32	130	130
	40	150	150
	50	150	120
	65	140	140
	80	165	165
	100	205	205
	125	245	245
150	25	130	110
	32	150	130
	40	150	150
	50	150	120
	65	150	140
	80	165	165
	100	205	205
	125	245	245
	150	285	285

DN1	DN2	H	L1
		mm	mm
200	32	180	130
	40	200	150
	50	200	120
	65	200	140
	80	205	165
	100	205	205
	125	245	245
	150	285	285
	200	365	365
250	40	220	150
	50	220	120
	65	220	140
	80	220	165
	100	245	205
	125	245	245
	150	285	285
	200	305	365
	250	305	450
300	65	245	140
	80	245	165
	100	245	205
	125	245	245
	150	285	285
	200	305	365
	250	305	450
	300	305	525

DN2

L1

LININGS

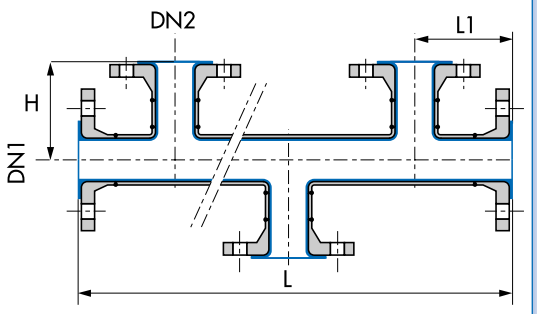
> **PTFE :** DN 25 - DN 300
> **ANTI STATIC PTFE :** DN 25 - DN 300 : C4 = A

Range and thickness Page 5

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

L max : 1,5 meter

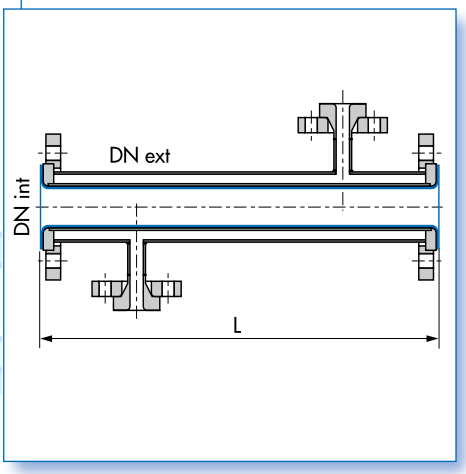
FIXED FLANGES MANIFOLDS TYPE W



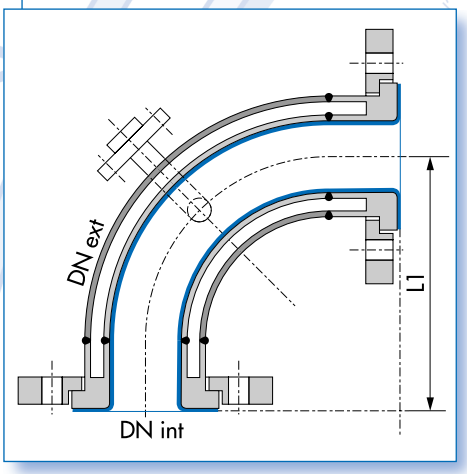
STRAIGHT LENGTHS

DN int	DN ext	L min mm	L max mm
20	32	200	6000
25	40	200	6000
32	50	200	6000
40	65	200	6000
50	80	200	6000
65	100	200	6000
80	100	200	6000
100	125	200	6000

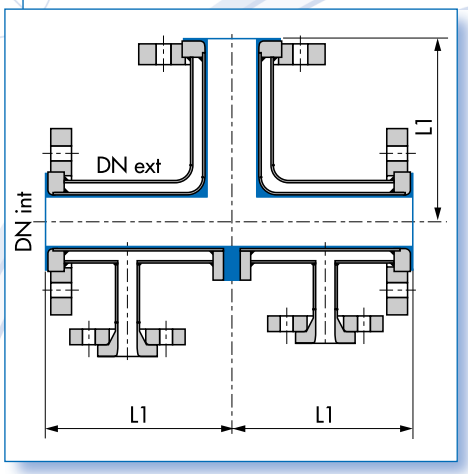
STRAIGHT LENGTHS



90° ELBOWS



EQUAL TEES



90° ELBOWS & EQUAL TEES

DN int	DN ext	L1 mm
25	40	110
32	50	130
40	65	150
50	80	120
65	100	140
80	100	165
100	125	205

The jacketed pipe connections are made via DN 20 flange branches.
Other connection types are possible on request.
Other dimensions and part type on request.

LININGS

> **PTFE/PFA :** DN 25 - DN 100
> **ANTI STATIC PTFE/PFA :** DN 25 - DN 100 : C4 = A

Range and thickness Page 5

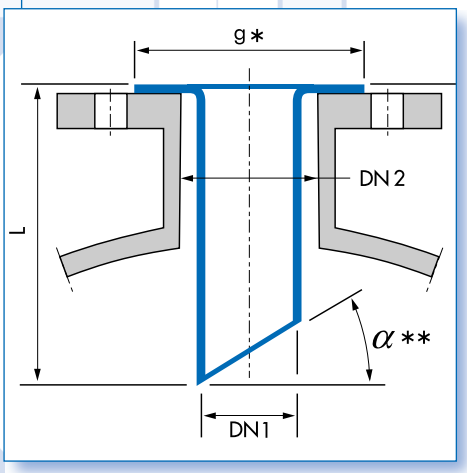
DIP PIPES & ENTRY PIPES

ENTRY PIPES

DN1	DN2 min	L max mm	Reference 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
20	25	3000	D 1 - - N x x x x J
25	32	3000	D 1 - - N x x x x K
32	40	3000	D 1 - - N x x x x L
40	50	3000	D 1 - - N x x x x M
50	65	3000	D 1 - - N x x x x N
65	80	3000	D 1 - - N x x x x O
80	100	3000	D 1 - - N x x x x P
100	125	3000	D 1 - - N x x x x Q
125	150	3000	D 1 - - N x x x x R
150	200	3000	D 1 - - N x x x x S
200	250	3000	D 1 - - N x x x x T
250	300	3000	D 1 - - N x x x x U
300	350	3000	D 1 - - N x x x x V
350	400	3000	D 1 - - N x x x x W
400	450	2000	D 1 - - N x x x x X
450	500	2000	D 1 - - N x x x x Y
500	600	1500	D 1 - - N x x x x Z

xxxx : length in mm

TYPE A



* Ø G collar in accordance with DN 2

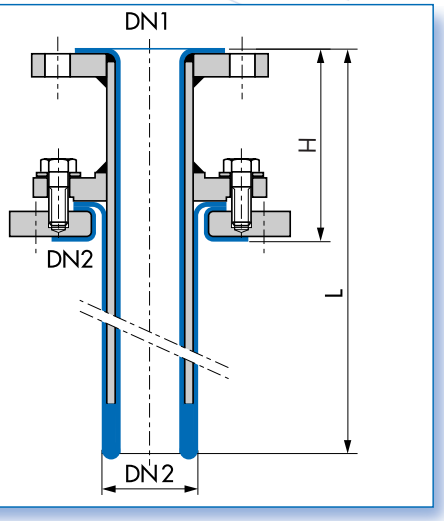
LININGS

> **PTFE :** DN 15 - DN 500
> **ANTI STATIC PTFE :** DN 15 - DN 400 : C4 = A

Range and thickness Page 5

Other special dip pipes are available on request.

TYPE B



DIP PIPES

DN1	DN2 min	H mm	L max mm
15	32	140	3000
20	32	140	3000
25	50	160	3000
32	65	170	3000
40	65	170	3000
50	80	180	3000
65	100	180	3000
80	100	190	3000
100	125	200	3000
150	200	200	3000

GROUPE
CARBONE LORRAINE