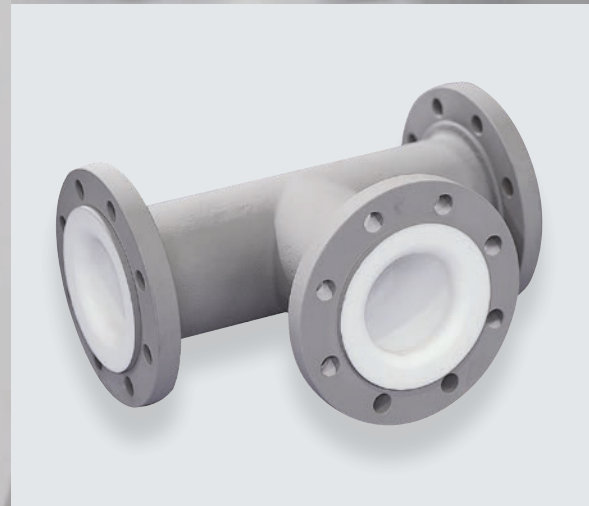
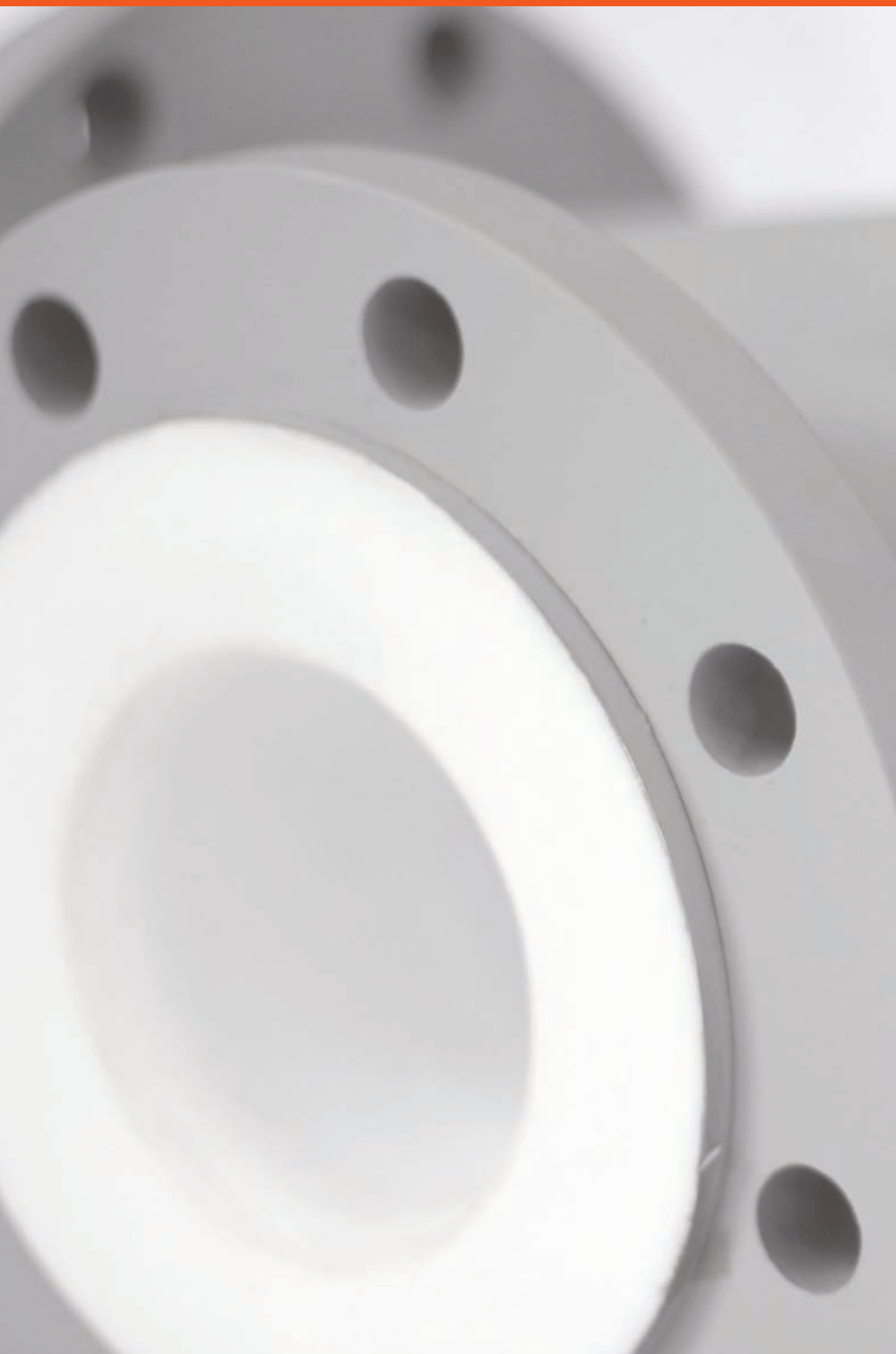




ARMYLOR® 2
PTFE / PFA
LINED PIPES
AND FITTINGS
ANSI B16.5



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EXPERTISE

Mersen has an engineering team dedicated to customer services.

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

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MERSEN ANTICORROSION EQUIPMENT










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

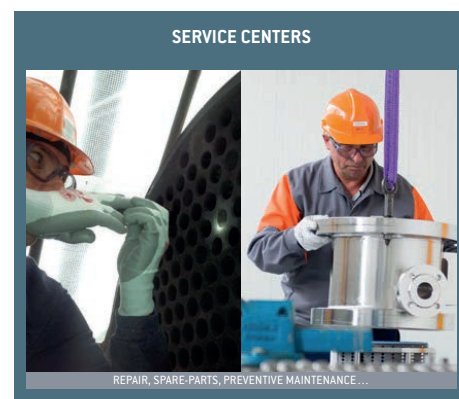
Mersen also has an in-depth knowledge of the process technologies requiring our AntiCorrosion Equipment and can provide offers from the basic equipment only, up to skid-mounted turn-key process packages.

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

THE PRODUCT RANGE CONSISTS OF :

- PTFE / PFA lined pipe and fittings
- PTFE bellows (expansion joints) and compensators

	HEAT EXCHANGERS				PRESSURE VESSELS & COLUMNS
GRAPHITE	 POLYBLOC	 POLYTUBE	 CUBIC	 ANNULAR GROOVE	 COLUMN
SILICON CARBIDE	 BLOCK	 SHELL & TUBE	 PLATE & FRAME	 PTFE	
TANTALUM	 SHELL & TUBE	 COIL	 BAYONET	 COLUMN	
ZIRCONIUM, TITANIUM AND NICKEL ALLOYS	 ZIRCONIUM	 TITANIUM	 NICKEL ALLOYS	 PRESSURE VESSEL	
PTFE PIPING, COMPENSATORS, BURSTING DISCS, TANTALUM SMALL PARTS					
	 PTFE LINED PIPING	 PIPE BELLOW	 GRAPHITE BURSTING DISC	 TANTALUM SMALL PARTS	



PTFE / PFA POLYMERS

DEFINITION

Available lining materials for our product range are as follows :

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

* Conductive black PTFE or PFA

** Also on request according to DIN 53455 standard

GENERAL CHARACTERISTICS

Values indicated in the following table are given for virgin PTFE and PFA.

These characteristics can vary depending on the material grades from the various suppliers, the transformation process and the batch.

PROPERTIES	UNITS	PTFE	PFA
Physical			
Density	g/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 mandhod		50 - 72	60 - 65
Thermal			
Flame propagation		hard	hard
Melting point	°C	327 and 342	300 to 310
Other transitions	°C	-90*,+123,* +27**	-80*, 90*
Maximum service temperature	°C	-200/+260	-150/+260
Temp. of deflection under load (1.82 MPa)	°C	50 - 60	50
Linear elongation coefficient	10 ⁵ / °C	10 - 25	12
Thermal conductivity	W / m.K	0.24	0.25
Electrical			
Dielectric constant from 60 Hz to 107 Hz		2.2	2.1
Volume resistivity	Ω.cm	10 ¹⁸	10 ¹⁸
Surface resistivity	Ω	10 ¹⁷	10 ¹⁷
Spark test (thick.mm)	kV / mm.K	36(1)	80(2.3)

*amorphous phase, **crystal phase

RECEIVING INSPECTIONS

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

PTFE / PFA LINING

Mersen proposes 2 ranges of Armylor® 2:

- Armylor®2 G to operate under pressure
- Armylor®2 V to operate under pressure and vacuum

PTFE / PFA NOMINAL THICKNESS

NB	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	20"	24"
G															7,5	7,5	7,5	7,5
V	3	3	3	3	4	4	4	4	4,5	6	6	7,5	7,5	7,5				

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

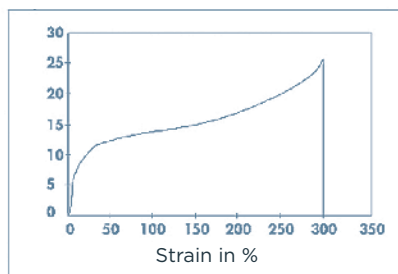
TESTS ON PTFE / PFA

Physical and mechanical tests

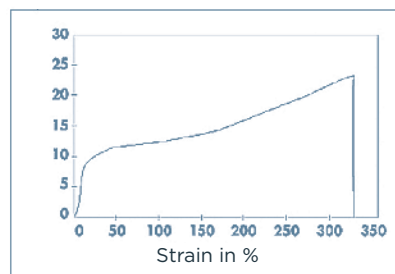
For each manufacturing batch, Mersen checks the mechanical & physical properties.

Values for elongation at break point and tensile strength, together with regularity of the graph confirms that the liner sintering has re-established the isotropy of PTFE, which guarantees a low level of permeability.

Parallel direction



Perpendicular direction



PTFE / PFA LINING

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

	MECHANICAL PROPERTIES		PHYSICAL PROPERTIES	
	Tensile strength	Elongation at break	Density	
PTFE Extruded Virgin Test according to standard	+ 21 N/mm ² (// Direction) + 17 N/mm ² (⊥ Direction) ASTM D4895	+ 250% (// Direction) + 200% (⊥ Direction) ASTM D4895	2.14 - 2.19 ASTM D792	2.13 - 2.19 DIN 53749
Antistatic Test according to standard	+ 21 N/mm ² (// Direction) + 17 N/mm ² (⊥ Direction) ASTM D4895	+ 250% (// Direction) + 200% (⊥ Direction) ASTM D4895	2.13 - 2.19 ASTM D792	2.12 - 2.18 DIN 53749
PFA Virgin Test according to standard	+ 26 N/mm ² ASTM D3307	+ 300% ASTM D3307	2.12 - 2.17 ASTM D792	2.12 - 2.17 DIN 53749
Antistatic Test according to standard	+ 26 N/mm ² ASTM D3307	+ 300% ASTM D3307	2.11 - 2.17 ASTM D792	2.11 - 2.16 DIN 53749

The results comply with the ASTM F1545 standard

ANTISTATIC PTFE / PFA ELECTRICAL PROPERTIES

Transverse resistivity : < 10⁷ Ω based on the BS ISO 2878 : 2005 standard

Surface resistivity : < 10⁸ Ω based on the BS ISO 14309 : 2011 standard

Volume resistivity : < 10⁸ Ω based on the BS ISO 14309 : 2011 standard



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

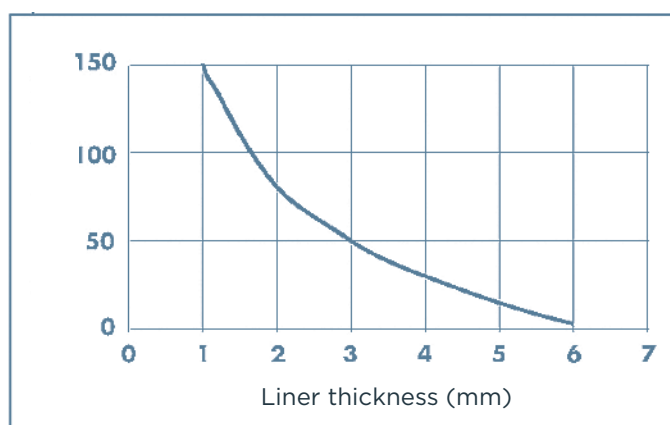
OPTIMIZING THE LINER THICKNESS - PERMEABILITY

SEVERAL FACTORS HAVE AN INFLUENCE :

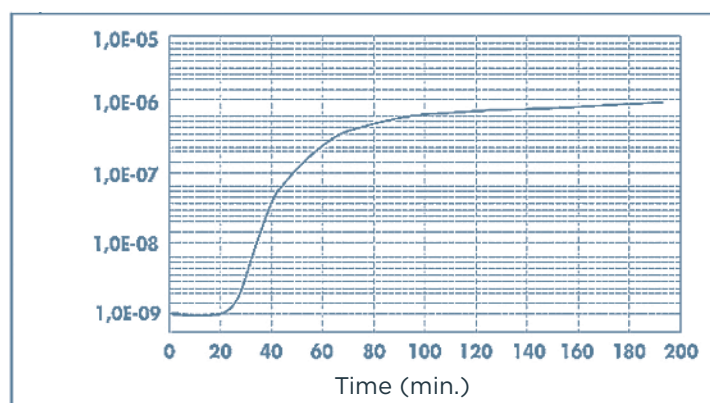
- ▶ **Thickness of the liner is the most significant factor.** The chart below shows the sharp decrease of permeability versus thickness.
- ▶ **Size of the ions or molecules :** the Helium permeability curve shows the ability of a very small molecule such as helium to pass through the PTFE / PFA.
- ▶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

EXAMPLES OF PERMEABILITY CURVES :

PTFE / PFA permeability curve



Helium permeability PTFE / PFA curve



STEEL PARTS

COMPONENTS

The table below shows the various steel components used for manufacturing our standard pieces. 3.1 mill certificates in accordance with EN 10204 are available on request.

ASTM compliant steel grades, low temperature or stainless steel grades can be supplied on request. Please contact us for more information.

DESCRIPTION	PIPES / BODIES		FLANGES	
	DIMENSIONAL STANDARD	GRADE	DIMENSIONAL STANDARD	GRADE
SPOOLS	ANSI B36.10	ASTM 106 Gr B	ANSI B16.5	ASTM A 105
WELDED CONSTRUCTION ELBOWS	ANSI B16.9/ANSI B16.28	ASTM A 234 WPB	ANSI B16.5	ASTM A 105
WELDED CONSTRUCTION TEES	ANSI B16.10/ANSI B16.9	ASTM A 106 Gr B ASTM A 234 WPB	ANSI B16.5	ASTM A 105
CONCENTRIC & ECCENTRIC REDUCERS	ANSI B16.9	ASTM A 234 WPB	ANSI B16.5	ASTM A 105
REDUCING FLANGE			ANSI B16.5	ASTM SA 516 Gr 60
SPACERS	ANSI B36.10	ASTM A 106 Gr B	ANSI B16.5	ASTM SA 516 Gr 60
WELDED CONSTRUCTION INSTRUMENT TEE		ASTM A 106 Gr B	ANSI B16.5	"ASTM A 105 ASTM SA 516 Gr 60"

WELDING

Welds are prepared by EN and ASME-qualified welders and processes such as GMAW, FCAW, GTAW and SAW. Quality of welds meets the requirements of the EN ISO 5817 level B standard.

VENT HOLES

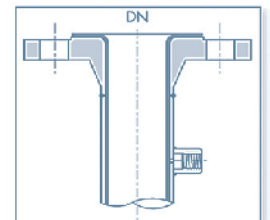
THE STEEL PARTS OF THE PTFE / PFA LINED FITTINGS ARE DRILLED WITH VENT HOLES IN ORDER TO :

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

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

VENT BOSSES

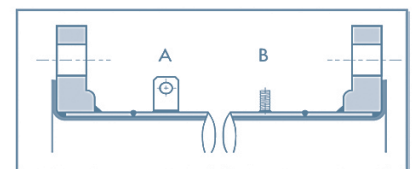
If vent holes must be identified quickly or when the piping is thermal insulated, a coupling can be welded on to the vent holes. In the case of different thermal insulation thicknesses, an extension stem can be screwed on to the coupling.



ELECTRICAL CONTINUITY

The electrical continuity of lined piping can be ensured by connecting each individual component together by using conductors linked to earthing lugs.

The latter are welded in the middle of the steel part for fittings and spools below 500 mm long and at about 150 mm from the back side of each flange for spools above 500 mm long. Types A or B earthing lugs can be proposed on request. Standard materials are 304 or 316 stainless steel grades.



Other materials can be supplied on request.

PAINTING

The standard coating is a 60 µm minimum thick zinc epoxy primer coating on sand blasted steel, in accordance with the S.A 2.5 cleanliness level. Other surface preparations, undercoats or topcoats can be applied on request.

LINED COMPONENTS

DIMENSIONAL TOLERANCES

The lined pieces and their dimensions are indicated in pages 15 to 30.
All the lined pieces are built using the following tolerances :

	DIMENSION	DIMENSIONAL TOLERANCE	ANGULAR TOLERANCE
LENGTHS	0 - 315 mm	+0; -3 mm	± 0.5°
	315 - 1000 mm	+0; -4 mm	± 0.5°
	1000 - 6000 mm	+0; -5 mm	± 0.5°
DIAMETERS	NB 1"-4"	+0; -3 mm	± 0.5°
	NB 5"-8"	+0; -4 mm	± 0.5°
	NB 10"-24"	+0; -5 mm	± 0.5°

Tolerance for PTFE / PFA : 5%

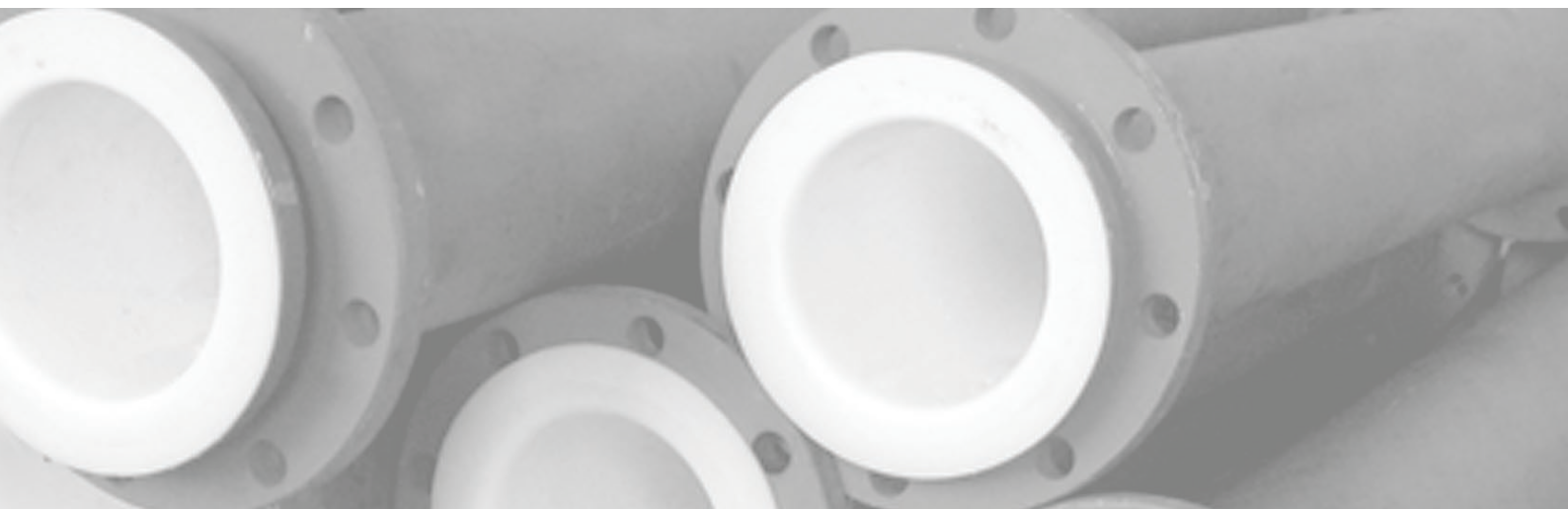
TEMPERATURE CYCLE TESTS

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

VACUUM RESISTANCE

NB	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	8"	10"	12"	14"	16"
ARMYLOR® G										no vacuum					
ARMYLOR® V	Vacuum 2 Torr 200°C											2 Torr 100°C			

Units : 760 Torrs = 760 mmHg = 1 bar = 1 kg/cm² = 10⁵ Pa = 14.7 Psi



QUALITY CONTROL

INSPECTIONS AND TESTS PROGRAM

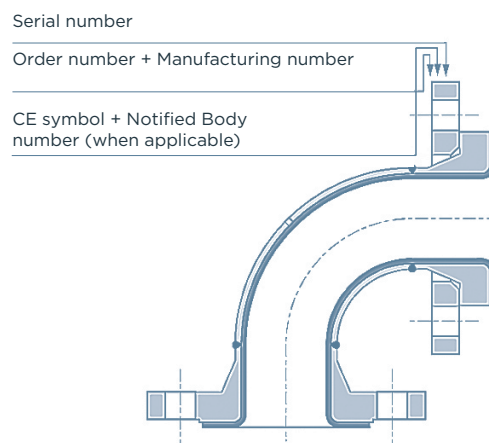
MERSEN manufactures PTFE-lined piping and fittings compliant with the the European Pressure Equipment Directive 2014/68/UE. Type agreements are awarded by Mersen's Notified Body for the whole range of ARMYLOR® products. In addition to assessments carried out by Third Parties and continuous internal audits,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

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

TRACEABILITY AND MARKING

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

- ▶ **Steel parts** : a coded marking system with unique traceability to the mill certificates is used. Marking transfers by Mersen qualified personnel are approved by Mersen's Notified Body.
- ▶ **Finished product** : in addition to the identification of label sticked on each item, the following information is stamped:
 - the applicable standard
 - the lining material
 - the manufacturing year and month
 - the CE mark and Notified Body number (when applicable)
 - the serial number
- ▶ **Traceability of documents** : total traceability is ensured with the same method for both steel and lining materials.



INSTALLATION PROCEDURE

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

PRECAUTIONS

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

CLEANING

Flared surface must be carefully cleaned prior to connection.

BOLT TIGHTENING

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

TIGHTENING BOLTS :

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

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

Values are given for Ansi 150 lbs flanges. They are indicated for room temperature and must always be checked in cold conditions, after 24 hours of operation, then checked periodically.

THE TIGHTENING TORQUE VALUES INDICATED BESIDE APPLY TO :

Class 8.8 steel nuts

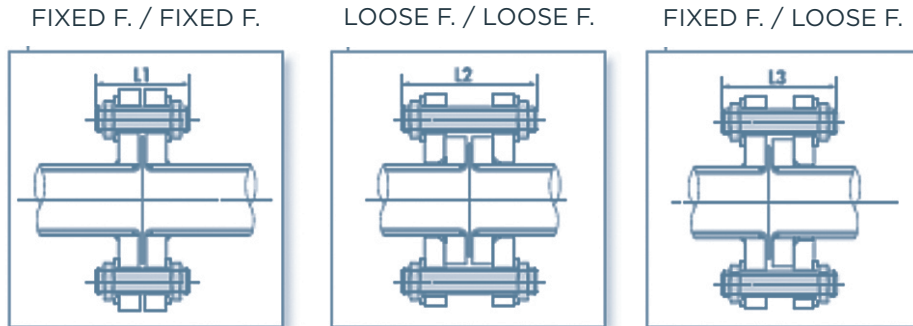
(resistant to 800 N/mm² rupture, elasticity limit of 640 N/mm²).

0.12. nut friction coefficient.

NB	BOLTS mm	TORQUE N.m
1/2"	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 1/2"	370
20"	20x1 1/8"	370
24"	20x1 1/4"	530

BOLT LENGTHS

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



THE DIMENSIONS INDICATED REFER TO :

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

VENT HOLES

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

WEIGHT

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

SUPPORTS

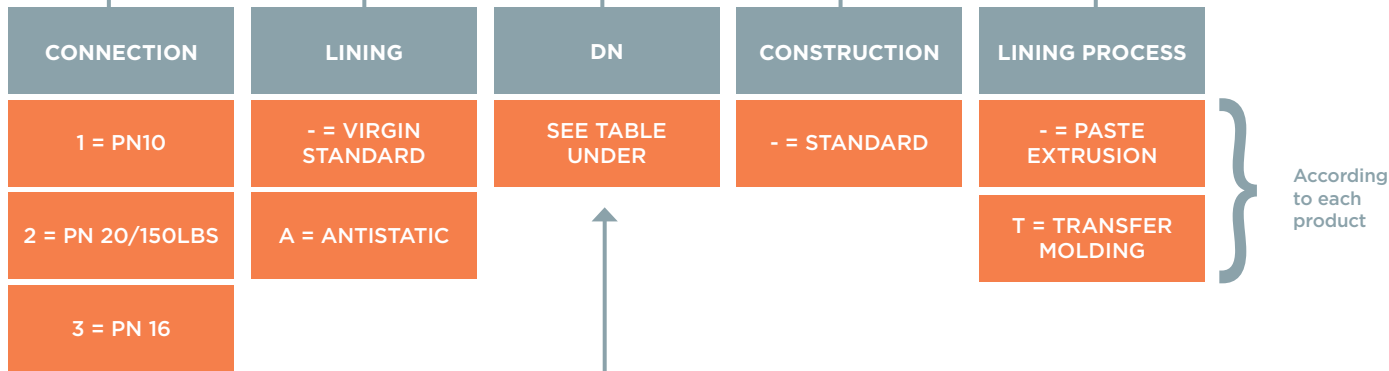
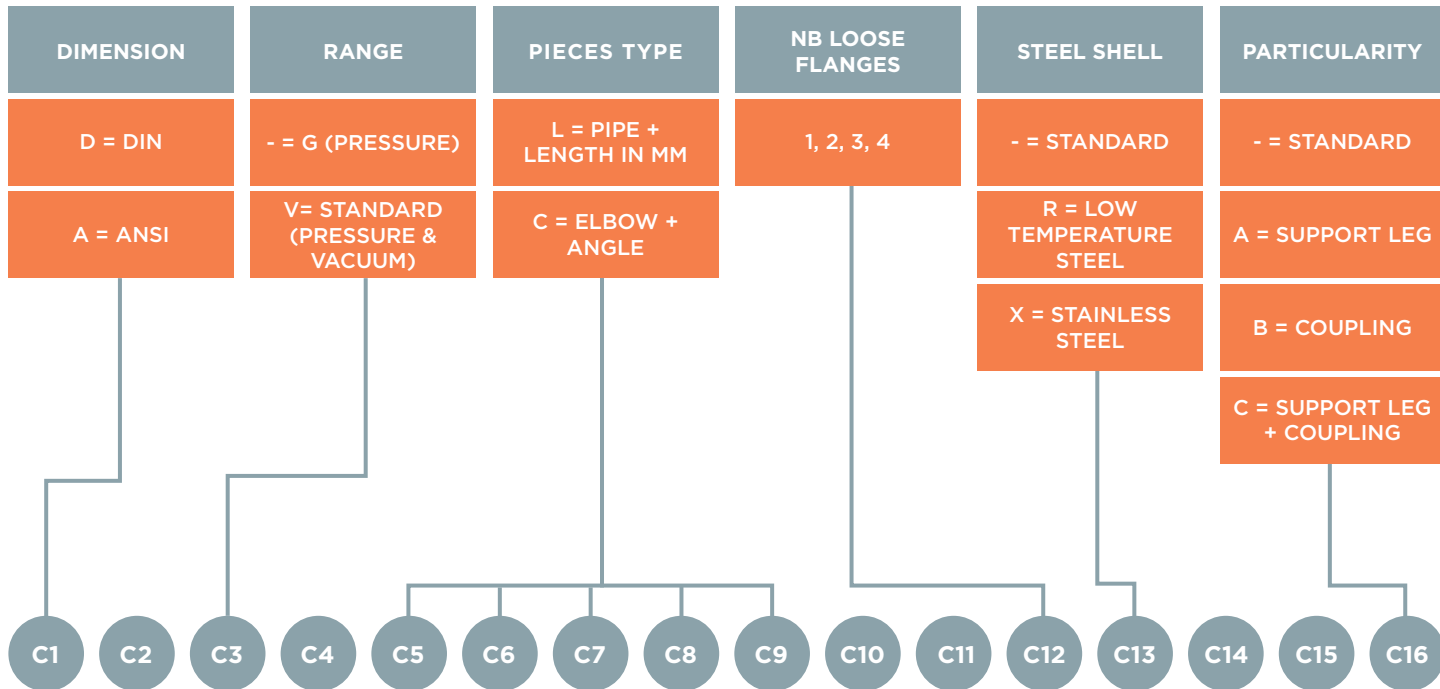
Elements must be supported using collars that are not welded on the lined piping. **Never weld on lined parts.** However, supporting elements may be welded prior to lining.

NB	L1 mm	L2 mm	L3 mm
NB 1/2"	75	95	85
NB 3/4"	80	100	90
NB 1"	80	105	90
NB 1 1/4"	90	115	100
NB 1 1/2"	90	115	100
NB 2"	100	125	110
NB 2 1/2"	100	130	115
NB 3"	110	140	125
NB 4"	110	140	125
NB 5"	115	145	135
NB 6"	125	165	145
NB 8"	135	175	155
NB 10"	150	195	175
NB 12"	155	205	175
NB 14"	170	220	195
NB 16"	175	225	195
NB 18"	185	235	215
NB 20"	195	245	220
NB 24"	205	260	230

CODING SYSTEM AND REFERENCES

Each element has its own unique reference which allows its identification.

This reference is composed on 16 alphanumeric characters. In some cases, the character can be «-» if refers to standard. The references that are mentioned in the dimensional tables are the standard ones.



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"		
O	65	V	300		

PRODUCTS DATA SHEETS

DIN FLANGES ANSI 150LBS AND PIPES [p.15](#)

FLANGED SPOOLS [p.16](#)

ELBOWS [p.17](#)

EQUAL TEES [p.18](#)

REDUCING TEES [p.19-20](#)

CONCENTRIC & ECCENTRIC REDUCERS [p.21](#)

REDUCING FLANGES [p.22-24](#)

INSTRUMENT TEES [p.25](#)

CROSSES [p.26](#)

SPACERS [p.28](#)

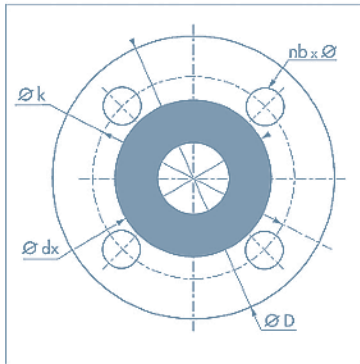
SPECTACLE BLINDS [p.29](#)

BLIND FLANGES & LATERAL TEES [p.30](#)

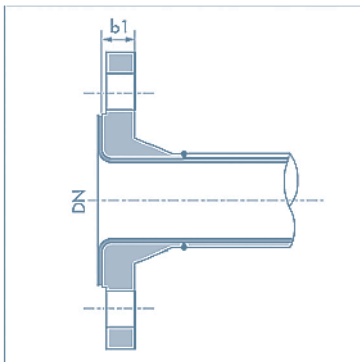
ANSI 150 LBS FLANGES AND TUBES

DIMENSIONAL TOLERANCES

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



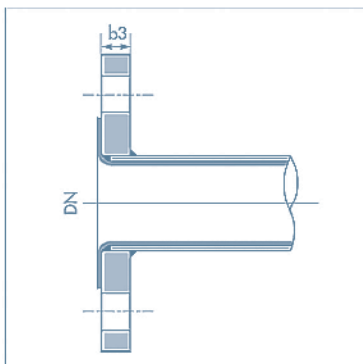
Flange (front view)



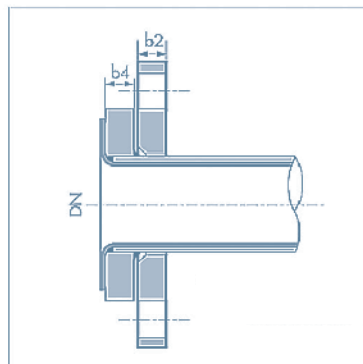
Welding neck type W (Fixed)

NB	DIAMETERS			THICKNESS				DRILLING ANSI 150LBS			STEEL TUBES		
	D	dx*	k	b1	b2	b3	b4	holes		bolting	d1	s	
	mm	mm	mm	mm	mm	mm	mm	nb	x	Ø	UNC	mm	mm
1/2"	89	31	42	60.3	11.1	9.5	10	4	x	16	1/2	26.7	2.9
3/4"	99	39	52	69.0	12.7	11.1	12	4	x	16	1/2	26.7	2.9
1"	108	47	60	79.4	14.3	12.7	12	4	x	16	1/2	33.4	3.4
1 1/2"	127	68	73	98.4	17.5	15.9	12	4	x	16	1/2	48.3	3.7
2"	152	87	92	120.6	19.0	17.4	14	4	x	20	5/8	60.3	3.9
3"	191	117	127	152.4	23.8	22.2	16	4	x	20	5/8	88.9	5.5
4"	229	150	157	190.5	23.8	22.2	16	8	x	20	5/8	114.3	6.0
6"	279	203	216	241.3	25.4	23.8	18	8	x	23	3/4	168.3	7.1
8"	343	255	270		28.6	27.0	20	8	x	23	3/4	219.1	8.2
10"	406	311	324	361.9	30.2	28.6	22	12	x	26	7/8	273.0	9,3
12"	485	365	381	431.8	32.7	31.1	24	12	x	26	7/8	323.8	9,5
14"	535	393	413		34.9	33.3	25	12	x	29	1	355.6	9,5
16"	597	450	470		36.5	34.9	25	16	x	29	1	406.4	9,5
18"	635	514	533	577.8	39.7	38.1	25	16	x	32	1 1/8	457.2	9,5
20"	699	565	584		42.9	41.3	25	20	x	32	1 1/8	508.0	9.5
24"	813	666	692		47.6	46.0	25	20	x	35	1 1/4	609.8	9.5

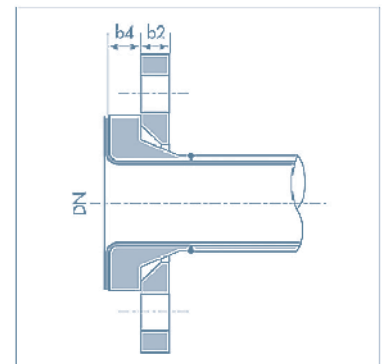
* Tolerance 5%



Slip-on Type P (Fixed)



Collar + slip-on type P (loose)



Collar + slip-on type W

FLANGED SPOOLS



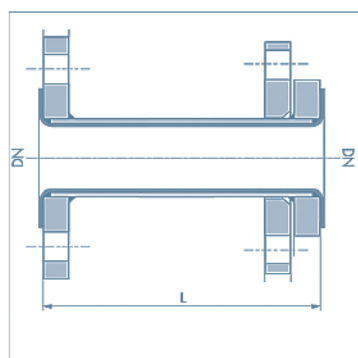
LINING

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

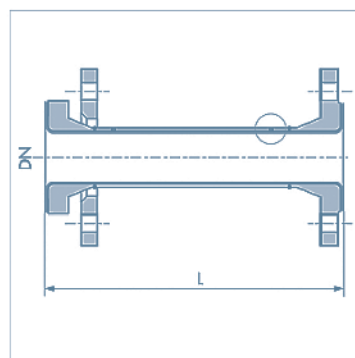
Standard construction: 1 fixed flange, 1 loose flange

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

*For vacuum thickness, L max = 4500 and xxx = length in mm.



Type P construction



Type W construction

ELBOWS



LINING

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

Standard construction :

- 1 fixed flange + 1 loose flange up to NB 6"
- 2 fixed flanges from NB 8" up to NB 24"

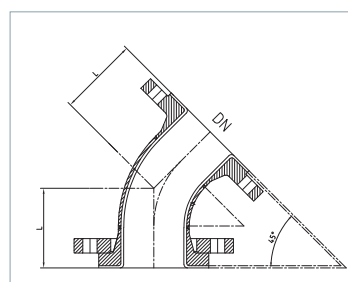
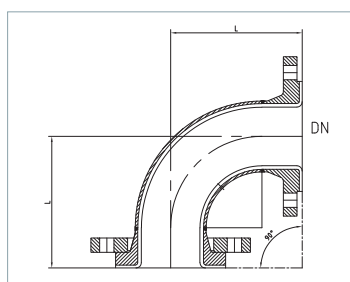
NB	L (mm)				Weight (kg)				REFERENCE																
	α=90°	α=45°	α=60°	α=30°	90°	45°	60°	30°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1/2"	65	45	45	45	1,7	1,5	1,6	1,5	A	2	V	-	C	?	?	-	-	H	-	1					
3/4"	75	45	45	45	2,1	2	2,2	2,1	A	2	V	-	C	?	?	-	-	K	-	1					
1"	89	45	45	45	2,7	3	2,7	2,6	A	2	V	-	C	?	?	-	-	L	-	1					
1 1/2"	102	57	57	57	6,5	6	4,6	4,3	A	2	V	-	C	?	?	-	-	M	-	1					
2"	114	64	64	64	7	6,5	5,9	5,6	A	2	V	-	C	?	?	-	-	N	-	1					
3"	140	76	76	76	17	15	9,7	8,9	A	2	V	-	C	?	?	-	-	P	-	1					
4"	165	102	102	102	21	20	11	10	A	2	V	-	C	?	?	-	-	Q	-	1					
6"	203	127	114	114	36	33	21	18	A	2	V	-	C	?	?	-	-	S	-	1					
8"	229	140	127	127	57	54	37	28	A	2	V	-	C	?	?	-	-	T							
10"	419*	165	140	140	82	75	52	39	A	2	V	-	C	?	?	-	-	U							
12"	483*	191	165	165	111	110	69	50	A	2	V	-	C	?	?	-	-	V							
14"	546*	191	190	190	165	125	120	74	A	2	-	-	C	?	?	-	-	W							
16"	610*	203	340	203	192	145	160	102	A	2	-	-	C	?	?	-	-	X							
18"	673*	216	440	240	235	185	169	125	A	2	-	-	C	?	?	-	-	Y							
20"	737*	241	460	225	280	210	230	162	A	2	-	-	C	?	?	-	-	Z							
24"	864*	279			402	320	550	212	A	2	-	-	C	?	?	-	-	B							

* 2 parts or 3 parts construction

? : Angle in degree : 90, 45, 60 or 30

Special angle available on request

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



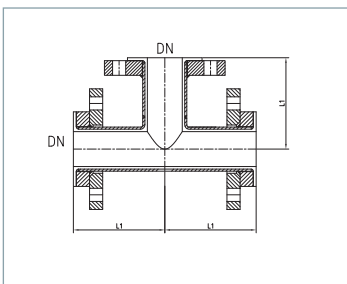
EQUAL TEES

LINING

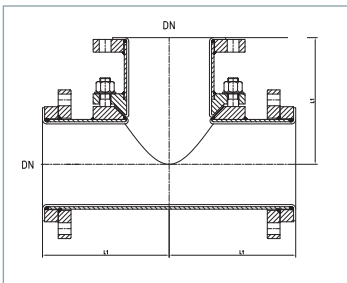
- ▶ VIRGIN PFA : NB 1/2" - NB 4"
- ▶ ANTISTATIC PFA : NB 1/2" - NB 4", C4 = A
- ▶ VIRGIN PTFE : NB 5" - NB 24"
- ▶ ANTISTATIC PTFE : NB 5" - NB 16", C4 = A

Standard construction :

- 1 fixed flange on nozzle + 2 loose flanges on body up to NB 6"
- 3 fixed flanges from NB 8" up to NB 24"



Construction in 1 part

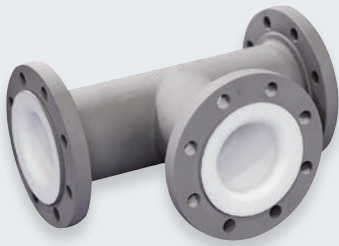


Construction in 2 parts

NB	L1 mm	Weight kg	REFERENCE															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2"	65	1.6	A	2	V	-	T	E	-	-	-	H	-	2				
3/4"	75	2.2	A	2	V	-	T	E	-	-	-	J	-	2				
1"	89	3.5	A	2	V	-	T	E	-	-	-	K	-	2				
1 1/2"	102	5.9	A	2	V	-	T	E	-	-	-	M	-	2				
2"	114	9.2	A	2	V	-	T	E	-	-	-	N	-	2				
3"	140	17.9	A	2	V	-	T	E	-	-	-	P	-	2				
4"	165	26.1	A	2	V	-	T	E	-	-	-	Q	-	2				
6"	203	41.7	A	2	V	-	T	E	-	-	-	S	-	2				
8"	229	68.8	A	2	V	-	T	E	-	-	-	T						
10"	279	96.8	A	2	V	-	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						

*2 parts construction

REDUCING TEES



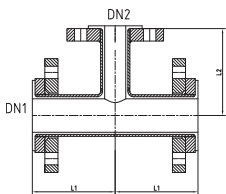
LINING

- ▶ VIRGIN PFA : NB 3/4" - NB 4"
- ▶ ANTISTATIC PFA : NB 3/4" - NB 4", C4 = A
- ▶ VIRGIN PTFE : NB 5" - NB 24"
- ▶ ANTISTATIC PTFE : NB 5" - NB 24", C4 = A

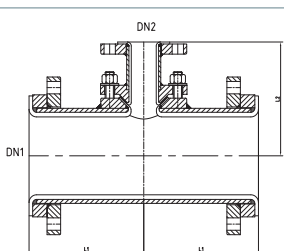
Standard construction :

■ 1 fixed flange on nozzle + 2 loose flanges on body up to NB 6"

■ 3 fixed flanges from NB 8" up to NB 24"



Construction in 1 part



Construction in 2 parts

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

*2 parts construction

REDUCING TEES

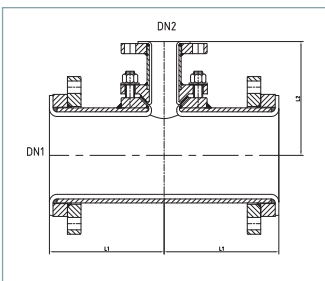


LINING

- ▶ VIRGIN PTFE : NB 6'' - NB 24''
- ▶ ANTISTATIC PTFE, C4 = A : NB 6'' - NB 16''

Standard construction :

- 1 fixed flange on nozzle + 2 loose flanges on body up to NB 6''
- 3 fixed flanges from NB 8'' - NB 24''



Construction in 2 parts

NB1	NB2	L mm	Weight kg	REFERENCE															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10''*	4''	279	78.8	A	2	V	-	T	R	-	-	-	U	Q					
	6''	279	83.0	A	2	V	-	T	R	-	-	-	U	S					
	8''	279	90.6	A	2	V	-	T	R	-	-	-	U	T					
12''*	4''	305	104	A	2	V	-	T	R	-	-	-	V	Q					
	6''	305	108	A	2	V	-	T	R	-	-	-	V	S					
	8''	305	115	A	2	V	-	T	R	-	-	-	V	T					
14''*	10''	305	122	A	2	V	-	T	R	-	-	-	V	U					
	4''	356	145	A	2	-	-	T	R	-	-	-	W	Q					
	6''	356	152	A	2	-	-	T	R	-	-	-	W	S					
	8''	356	165	A	2	-	-	T	R	-	-	-	W	T					
16''*	10''	356	176	A	2	-	-	T	R	-	-	-	W	U					
	12''	356	197	A	2	-	-	T	R	-	-	-	W	V					
	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					
18''*	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					
	8''	419	225	A	2	-	-	T	R	-	-	-	Y	T					
	10''	419	236	A	2	-	-	T	R	-	-	-	Y	U					
20''*	12''	419	257	A	2	-	-	T	R	-	-	-	Y	V					
	14''	419	276	A	2	-	-	T	R	-	-	-	Y	W					
	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					
24''*	16''	457	352	A	2	-	-	T	R	-	-	-	Z	X					
	18''	457	364	A	2	-	-	T	R	-	-	-	Z	Y					
	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					
24''*	16''	559	441	A	2	-	-	T	R	-	-	-	B	X					
	18''	559	455	A	2	-	-	T	R	-	-	-	B	Y					

*2 parts construction

CONCENTRIC & ECCENTRIC REDUCERS



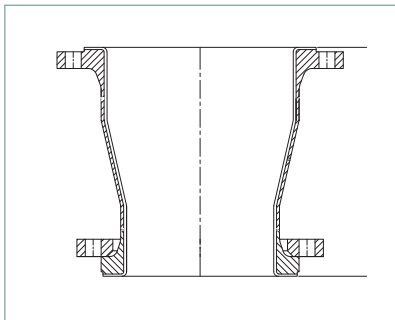
LINING

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

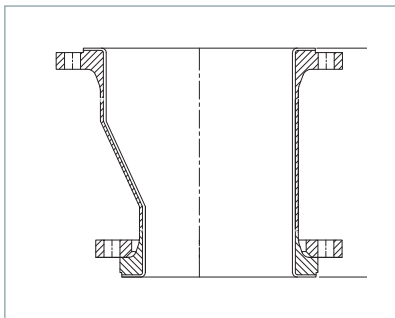
Standard construction :

- Fixed flange
/ 1 loose flange

Concentric reducer



Eccentric reducer



NB1	NB2	L1 mm	E mm	Weight kg	REFERENCE															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1/2"	114	3.4	1.6	A	2	V	-	R	?	-	-	-	K	H	1				
	3/4"	114	3.4	1.8	A	2	V	-	R	?	-	-	-	K	J	1				
1 1/2"	3/4"	114	10	2.5	A	2	V	-	R	?	-	-	-	M	J	1				
	1"	114	7.0	2.9	A	2	V	-	R	?	-	-	-	M	K	1				
2"	3/4"	127	4.6	3.5	A	2	V	-	R	?	-	-	-	N	J	1				
	1"	127	13	3.9	A	2	V	-	R	?	-	-	-	N	K	1				
3"	1 1/2"	127	5.7	4.6	A	2	V	-	R	?	-	-	-	N	M	1				
	1 1/2"	152	20	7.2	A	2	V	-	R	?	-	-	-	P	M	1				
4"	2"	152	14	8.2	A	2	V	-	R	?	-	-	-	P	M	1				
	1 1/2"	178	32	9.5	A	2	V	-	R	?	-	-	-	Q	M	1				
6"	2"	178	26	10.5	A	2	V	-	R	?	-	-	-	Q	N	1				
	3"	178	13	13.1	A	2	V	-	R	?	-	-	-	Q	P	1				
8"	3"	229	40	17.6	A	2	V	-	R	?	-	-	-	S	P	1				
	4"	229	26	19.9	A	2	V	-	R	?	-	-	-	S	Q	1				
10"	4"	279	52	28.5	A	2	V	-	R	?	-	-	-	T	Q					
	6"	279	25	32.6	A	2	V	-	R	?	-	-	-	T	S					
12"	6"	305	52	40.0	A	2	V	-	R	?	-	-	-	U	S					
	8"	305	27	47.6	A	2	V	-	R	?	-	-	-	U	T					
14"	6"	356	75	53.1	A	2	V	-	R	?	-	-	-	V	S					
	8"	356	51	61.2	A	2	V	-	R	?	-	-	-	V	T					
16"	10"	356	26	67.7	A	2	V	-	R	?	-	-	-	V	U					
	8"	406	67	75.3	A	2	-	-	R	?	-	-	-	W	T					
18"	10"	406	41	82.1	A	2	-	-	R	?	-	-	-	W	U					
	12"	406	16	92.7	A	2	-	-	R	?	-	-	-	W	V					
20"	10"	457	66	97.5	A	2	-	-	R	?	-	-	-	X	U					
	12"	457	41	108	A	2	-	-	R	?	-	-	-	X	V					
22"	14"	457	25	120	A	2	-	-	R	?	-	-	-	X	W					
	12"	483	66	118	A	2	-	-	R	?	-	-	-	Y	V					
24"	14"	483	51	130	A	2	-	-	R	?	-	-	-	Y	W					
	16"	483	25	142	A	2	-	-	R	?	-	-	-	Y	X					
26"	14"	508	76	152	A	2	-	-	R	?	-	-	-	Z	W					
	16"	508	51	163	A	2	-	-	R	?	-	-	-	Z	X					
28"	18"	508	25	172	A	2	-	-	R	?	-	-	-	Z	Y					
	20"	610	51	226	A	2	-	-	R	?	-	-	-	B	Z					

() Dimension non available in eccentric reducer ? = C : Concentric Reducer ? = E : Eccentric Reducer

REDUCING FLANGES

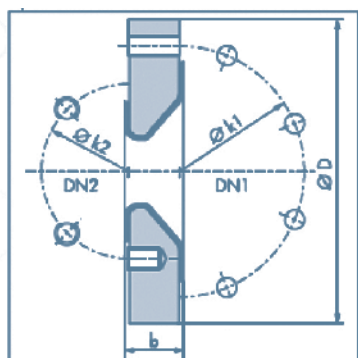


LINING

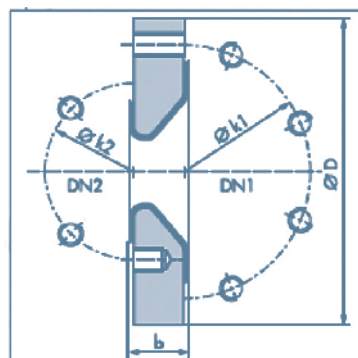
▶ VIRGIN PTFE / PFA : NB 3/4" - NB 3"

▶ ANTISTATIC PTFE/PFA, C4 = A : NB 3/4" - NB 3"

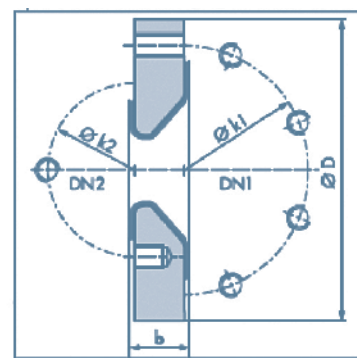
NB1	NB2	ØD mm	b	NB1			NB2			Type	Weight kg	REFERENCE																
				Ø k1 mm	Holes bolt		Ø k2 mm	Holes bolt				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
					nb	Ø		UNC	nb																			UNC
3/4"	1/2"	98	35	69.8	4 x	1/2"	60.3	4 x	1/2"	C	1.9	A	2	V	-	B	R	-	-	-	J	H						
1	1/2"	108	35	79.4	4 x	1/2"	60.3	4 x	1/2"	C	2.1	A	2	V	-	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	V	-	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	V	-	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	V	-	B	R	-	-	-	M	J						
2"	1/2"	152	35	120.6	4 x	5/8"	60.3	4 x	1/2"	B	4.8	A	2	V	-	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	V	-	B	R	-	-	-	N	J						
3"	1/2"	190	35	152.4	4 x	5/8"	60.3	4 x	1/2"	A	6.7	A	2	V	-	B	R	-	-	-	P	H						
	3/4"	190	35	152.4	4 x	5/8"	69.8	4 x	1/2"	A	6.6	A	2	V	-	B	R	-	-	-	P	J						
4"	1/2"	229	45	190.5	8 x	5/8"	60.3	4 x	1/2"	A	11	A	2	V	-	B	R	-	-	-	Q	H						
	3/4"	229	45	190.5	8 x	5/8"	69.8	4 x	1/2"	A	20	A	2	V	-	B	R	-	-	-	Q	J						



Tapped hole / through hole type A



Tapped hole type B



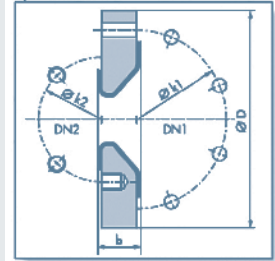
Tapped holes on center-line/ off center-line type C

REDUCING FLANGES



LINING

- ▶ VIRGIN PTFE/PFA : NB 4" - NB 10"
- ▶ ANTI STATIC PTFE/PFA, , C4 = A : NB 4" - NB 10"



Tapped hole / through hole type A

NB1	NB2	ØD mm	b mm	NB1			NB2			Type	Weight kg	REFERENCE																	
				Ø k1 mm	Holes		Ø k2 mm	Holes				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
					nb	Ø		UNC	nb																			UNC	
6"	1"	279	45	241.3	8 x	22		79.4	4 x	1/2"	A	17	A	2	V	-	B	R	-	-	-	S	K						
	1 1/2"	279	45	241.3	8 x	22		98.4	4 x	1/2"	A	17	A	2	V	-	B	R	-	-	-	S	M						
	2"	279	45	241.3	8 x	22			4 x	5/8"	A	17	A	2	V	-	B	R	-	-	-	S	N						
	3"	279	45	241.3	8 x		3/4"		4 x	5/8"	B	16	A	2	V	-	B	R	-	-	-	S	P						
	4"	279	45	241.3	8 x		3/4"		8 x	5/8"	C	15	A	2	V	-	B	R	-	-	-	S	Q						
8"	1"	343	45		8 x	22		79.4	4 x	1/2"	A	25	A	2	V	-	B	R	-	-	-	T	K						
	1 1/2"	343	45		8 x	22		98.4	4 x	1/2"	A	25	A	2	V	-	B	R	-	-	-	T	M						
	2"	343	45		8 x	22			4 x	5/8"	A	25	A	2	V	-	B	R	-	-	-	T	N						
	3"	343	45		8 x	22			4 x	5/8"	A	24	A	2	V	-	B	R	-	-	-	T	P						
	4"	343	45		8 x	22			8 x	5/8"	A	23	A	2	V	-	B	R	-	-	-	T	Q						
	6"	343	45		8 x		3/4"	241.3	8 x	3/4"	B	20	A	2	V	-	B	R	-	-	-	T	S						
10"	1 1/2"	406	45		12 x	25.5		98.4	4 x	1/2"	A	34	A	2	V	-	B	R	-	-	-	U	M						
	2"	406	45		12 x	25.5			4 x	1/2"	A	34	A	2	V	-	B	R	-	-	-	U	N						
	3"	406	45		12 x	25.5			4 x	1/2"	A	33	A	2	V	-	B	R	-	-	-	U	P						
	4"	406	45		12 x	25.5			8 x	5/8"	A	33	A	2	V	-	B	R	-	-	-	U	Q						
	6"	406	45		12 x	25.5		241.3	8 x	3/4"	A	30	A	2	V	-	B	R	-	-	-	U	S						
	*8"	406	45		12 x		7/8"		8 x	3/4"	B	27	A	2	V	-	B	R	-	-	-	U	T						
12"	2"	483	50		12 x	25.5			4 x	1/2"	A	55	A	2	V	-	B	R	-	-	-	V	N						
	3"	483	50		12 x	25.5			4 x	1/2"	A	54	A	2	V	-	B	R	-	-	-	V	P						
	4"	483	50		12 x	25.5			8 x	5/8"	A	54	A	2	V	-	B	R	-	-	-	V	Q						
	6"	483	50		12 x	25.5		241.3	8 x	3/4"	A	49	A	2	V	-	B	R	-	-	-	V	S						
	8"	483	50		12 x	25.5			8 x	3/4"	A	44	A	2	V	-	B	R	-	-	-	V	T						
	*10"	483	50		12 x		7/8"		12 x	7/8"	B	43	A	2	V	-	B	R	-	-	-	V	U						

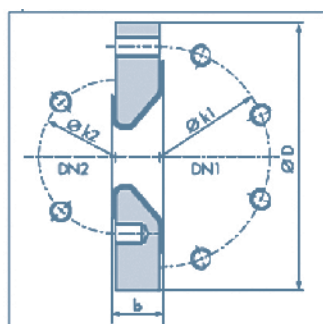
REDUCING FLANGES



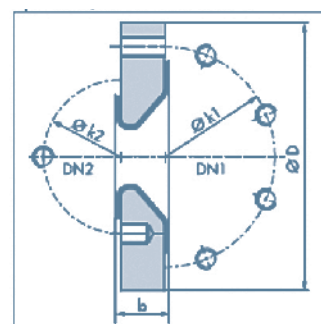
LINING

- ▶ VIRGIN PTFE/PFA : NB 10'' - NB 24''
- ▶ ANTISTATIC PTFE/PFA, C4 = A : NB 10'' - NB 24''

NB1	NB2	Ø D mm	b mm	NB1			NB2			Type	Weight kg	REFERENCE																
				Ø k1 mm	Holes bolt		Ø k2 mm	Holes				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
					nb	Ø		UNC	nb																			UNC
14''	6''	533	50		12 x		241.3	8 x	3/4''	A	60	A	2	-	-	B	R	-	-	-	W	S						
	8''	533	50		12 x			8 x	3/4''	A	56	A	2	-	-	B	R	-	-	-	W	T						
	10''	533	50		12 x		361.9	12 x	7/8''	A	53	A	2	-	-	B	R	-	-	-	W	U						
	12''	533	50		12 x	1''	431.8	12 x	7/8''	B	50	A	2	-	-	B	R	-	-	-	W	V						
16''	8''	597	50		16 x			8 x	3/4''	A	75	A	2	-	-	B	R	-	-	-	X	T						
	10''	597	50		16 x		361.9	12 x	7/8''	A	71	A	2	-	-	B	R	-	-	-	X	U						
	12''	597	50		16 x		431.8	12 x	7/8''	A	67	A	2	-	-	B	R	-	-	-	X	V						
	14''	597	50		16 x	1''		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			12 x	1''	A	73	A	2	-	-	B	R	-	-	-	Y	W						
	16''	635	50	577.8	16 x	1''1/2		16 x	1''	B	71	A	2	-	-	B	R	-	-	-	Y	X						
20''	*6''	698	50		20 x	31.7		241.3	8 x	7/8''	A	124	A	2	-	-	B	R	-	-	-	Z	S					
	*8''	698	50		20 x	31.7			8 x	7/8''	A	114	A	2	-	-	B	R	-	-	-	Z	T					
	10''	698	50		20 x			361.9	12 x	7/8''	A	207	A	2	-	-	B	R	-	-	-	Z	U					
	12''	698	50		20 x	31.7		431.8	12 x	7/8''	A	98	A	2	-	-	B	R	-	-	-	Z	V					
	14''	698	50		20 x	31.7			12 x	1''	A	93	A	2	-	-	B	R	-	-	-	Z	W					
	16''	698	50		20 x	31.7			16 x	1''	A	88	A	2	-	-	B	R	-	-	-	Z	X					
	18''	698	50		20 x		1''1/8	577.8	16 x	1''1/8	B	83	A	2	-	-	B	R	-	-	-	Z	Y					
24''	18''	813	50		20 x	35		577.8	16 x	1''1/8	A	80	A	2	-	-	B	R	-	-	-	B	Y					
	20''	813	50		20 x	35			20 x	1''1/8	A	78	A	2	-	-	B	R	-	-	-	B	Z					



Tapped holes type B



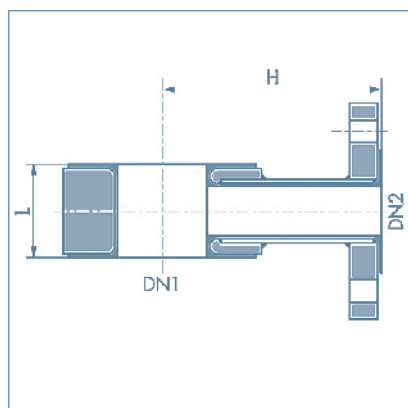
Tapped holes on center-line/
off center-line type C

INSTRUMENT TEES



LINING

- ▶ VIRGIN PFA :
NB 1/2" - NB 20"
- ▶ ANTISTATIC PFA,
C4 = A : NB 1/2" - NB 16"
- ▶ VIRGIN PTFE :
NB 24"



Fixed flanges

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

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

CROSSES

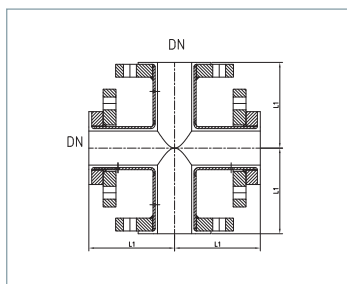


LINING

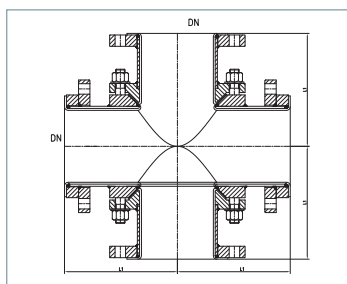
- ▶ VIRGIN PFA : NB 1/2" - NB 4"
- ▶ ANTISTATIC PFA : NB 1/2" - NB 4"
- ▶ VIRGIN PTFE : NB 5" - NB 24"
- ▶ ANTISTATIC PTFE / NB 5" - NB 16"

Standard construction :

- NB 1/2" to NB 6" : 2 loose flanges on body, 2 fixed flanges on nozzles
- NB 8" to NB 24" : 4 fixed flanges



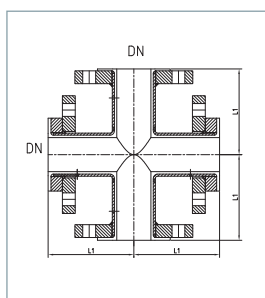
Construction 1 part



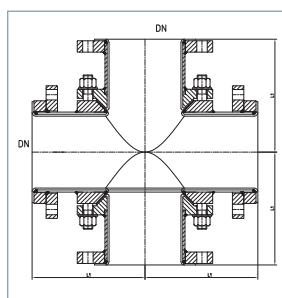
* construction in 3 parts

NB	L1 mm	Weight kg	REFERENCE															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/2"	65	2.1	A	2	V	-	X	E	-	-	-	H	-	2				
3/4"	75	2.9	A	2	V	-	X	E	-	-	-	J	-	2				
1"	89	4.6	A	2	V	-	X	E	-	-	-	K	-	2				
1 1/2"	102	7.8	A	2	V	-	X	E	-	-	-	M	-	2				
2"	114	12.1	A	2	V	-	X	E	-	-	-	N	-	2				
3"	140	23.6	A	2	V	-	X	E	-	-	-	P	-	2				
4"	165	34.2	A	2	V	-	X	E	-	-	-	Q	-	2				
6"	203	53.9	A	2	V	-	X	E	-	-	-	S	-	2				
8"	229	88.2	A	2	V	-	X	E	-	-	-	T						
10"	279	124	A	2	V	-	X	E	-	-	-	U						
12"	305	169	A	2	V	-	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						

REDUCING CROSSES



Construction 1 part



* construction in 3 parts

LINING

- ▶ **VIRGIN PFA :**
NB 3/4" - NB 4"
- ▶ **ANTISTATIC PFA, C4 = A :**
NB 3/4" - NB 4"
- ▶ **VIRGIN PTFE :**
NB 5" - NB 24"
- ▶ **ANTISTATIC PTFE, C4 = A :**
NB 5" - NB 16"

Standard construction:

- NB 1/2" to NB 6" loose flanges on body, 2 fixed flanges on nozzles
- NB 8" to NB 24": 4 fixed flanges

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

NB1	NB2	L1 mm	Weight kg	REFERENCE																				
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
10"	4"	279	78.8	A	2	V	-	X	R	-	-	-	U	Q										
	6"	279*	83.0	A	2	V	-	X	R	-	-	-	U	S										
	8"	279*	90.6	A	2	V	-	X	R	-	-	-	U	T										
12"	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"	8"	356*	165	A	2	-	-	X	R	-	-	-	W	T										
	10"	356*	176	A	2	-	-	X	R	-	-	-	W	U										
	12"	356*	197	A	2	-	-	X	R	-	-	-	W	V										
16"	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"	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"	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"	16"	559	441	A	2	-	-	X	R	-	-	-	B	X										
	18"	559	455	A	2	-	-	X	R	-	-	-	B	Y										
	20"	559	487	A	2	-	-	X	R	-	-	-	B	Z										

* 3 parts construction

SPACERS



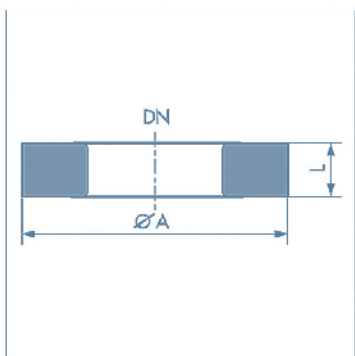
LINING

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

NB	ØA	F (mm)		G (mm)		H (mm)		REFERENCE																
		L	L min.	L max.	L min.	L max.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1/2"	42.0	15	15	60	60	100	A	2	V	-	?	-	x	x	x	H								
3/4"	52.0	20	15	60	60	100	A	2	V	-	?	-	x	x	x	J								
1"	66.5	20	15	60	60	100	A	2	V	-	?	-	x	x	x	K								
1 1/2"	85.5	20	15	60	60	100	A	2	V	-	?	-	x	x	x	M								
2"	105	20	15	60	60	100	A	2	V	-	?	-	x	x	x	N								
3"	136	20	15	60	70	125	A	2	V	-	?	-	x	x	x	P								
4"	174	20	15	70	70	125	A	2	V	-	?	-	x	x	x	Q								
6"	222	20	20	80	80	160	A	2	V	-	?	-	x	x	x	S								
8"	279	20	20	80	80	200	A	2	V	-	?	-	x	x	x	T								
10"	339	20	20	90	90	200	A	2	V	-	?	-	x	x	x	U								
12"	409	20	20	90	90	200	A	2	-	-	?	-	x	x	x	V								
14"	451	25	25	90	90	250	A	2	-	-	?	-	x	x	x	W								
16"	510	25	25	90	90	250	A	2	-	-	?	-	x	x	x	X								
18"	549	25	25	100	100	250	A	2	-	-	?	-	x	x	x	Y								
20"	590	25	25	100	100	250	A	2	-	-	?	-	x	x	x	Z								
24"	717	25	25	100	100	250	A	2	-	-	?	-	x	x	x	B								

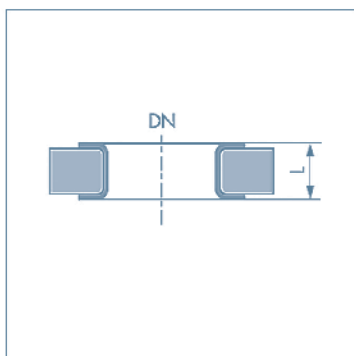
? = F : Spacers shape F ? = G : Spacers shape G ? = E : Spacers shape H xxxx : length in mm

Massive PTFE spacer



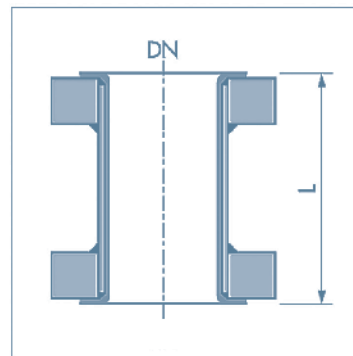
Shape F

Steel lined spacer



Shape G

Tube lined spacer



Shape H

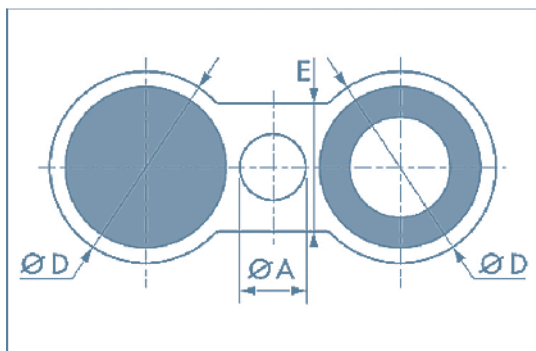
Mersen also supplies inclined spacers type F

SPECTACLE BLINDS

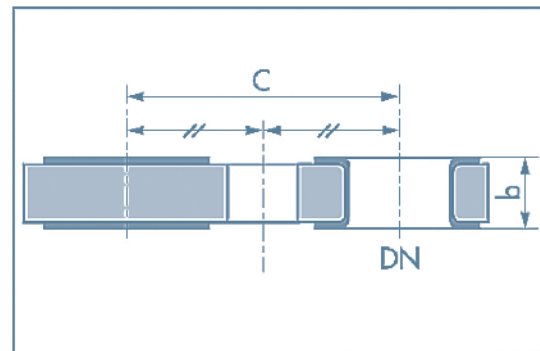
LINING

- ▶ VIRGIN PFA : NB 3/4" - NB 8"
- ▶ VIRGIN PTFE : NB 10" - NB 24"
- ▶ ANTISTATIC PFA, C4 = A : NB 3/4" - NB 8"
- ▶ ANTISTATIC PTFE, C4 = A : NB 10" - NB 16"

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



Spectacle blind (front view)



Spectacle blind (sectional view)

BLIND FLANGES & LATERAL TEES

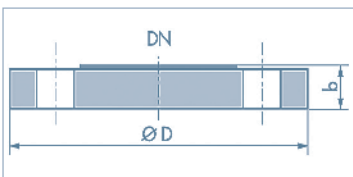
BLIND FLANGES



LINING

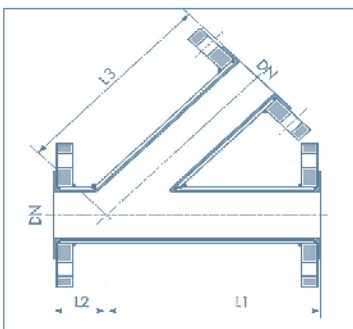
- ▶ **VIRGIN PTFE :**
NB 1/2" - NB 24"
- ▶ **PTFE ANTISTATIC,**
C4 = A : NB 1/2" - NB 16"

Possible to deliver with PTFE up to external diameter



NB	ØD	b	Weight	REFERENCE																	
				mm	mm	kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1/2"	89	14	0.3	A	2	V	-	B	P	-	-	-	H								
3/4"	98	16	0.5	A	2	V	-	B	P	-	-	-	J								
1"	108	17	0.9	A	2	V	-	B	P	-	-	-	K								
1 1/2"	127	18	1.3	A	2	V	-	B	P	-	-	-	M								
2"	152	22	2.4	A	2	V	-	B	P	-	-	-	N								
3"	190	27	4.9	A	2	V	-	B	P	-	-	-	P								
4"	229	27	6.9	A	2	V	-	B	P	-	-	-	Q								
6"	279	28	11	A	2	V	-	B	P	-	-	-	S								
8"	343	32	19	A	2	V	-	B	P	-	-	-	T								
10"	406	34	28	A	2	V	-	B	P	-	-	-	U								
12"	482	36	45	A	2	V	-	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								

LATERAL TEES



Lateral tees



NB	L1	L2	L3	Weight	REFERENCE																	
					mm	mm	mm	kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1"	146	44	146	3.7	A	2	V	-	T	L	-	-	-	K								
1 1/2"	178	51	178	6.5	A	2	V	-	T	L	-	-	-	M								
2"	203	64	203	10	A	2	V	-	T	L	-	-	-	N								
3"	254	76	254	21	A	2	V	-	T	L	-	-	-	P								
4"	305	76	305	31	A	2	V	-	T	L	-	-	-	Q								

LINING

- ▶ **VIRGIN PFA :** NB 1" - NB 4"
- ▶ **ANTISTATIC PFA, C4 = A :** NB 1" - NB 4"

For reducing lateral please contact us



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