Steel/PTFE-Pipes and Fittings

ANSI 16.5 Class 150

Blind Flanges

Spacers and Armoured Spacers

Elbows 45° and 90°

Crosses and Reducing Crosses

Reducers concentric and eccentric

Pipes (straight)

Tees and Reducing Tees

Lateral Tees (45°-Branch)

Instrument-Tappings

Reducing Flanges

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PTFE-lined Pipes, -Fittings and supplementary PTFE-lined Items General Information

Standard Performance

Straight pipes are equipped with loose and fixed flanges, fittings typically with fixed flanges. Extra loose flanges, however, are available upon request..

Identification

Apart from spacers (Type F) every type of lined item displays the manufacturer's logo (LMP). Supplementary data are being stamped in terms of nominal size, pressure rating, and material of lining and production date (month/year) respectively. A given serial number will allow an unequivocal identification in context with the quality assurance. Items lined with electrostatically conductive lining display the "Ω"-Symbol.

Wall Thicknesses

Wall thicknesses for pipes follow DIN 2848 Part 4 Column 2, for elbows DIN 2605 Part 1, Tees, Crosses und Reducing pieces ASME/ANSI Schedule 40 (DN 15 - DN 150), and commencing DN 200 ASME/ANSI Schedule 20.
The thickness of the liner goes up with increasing dimensions. The Standard thicknesses for PTFE range from 3 to 7 mm (DN 15 to DN 300). Electrostatically conductive lining will be 6 - 8 % inferior on account of higher shrinkage. The accepted variances remain in full accordance with the generally accepted GKV-Rules and yield ±10 % in terms of wall thickness and ±3 % in diameter.

Boundary Measures and Tolerances

Boundary measures and tolerances thereof are in compliance with DIN 2848 Part 3.

Supervision and Quality Assurance

Incoming raw materials, semi-finished products and readily manufactured items undergo regular quality assurance inspections.

- **Raw Materials**

PTFE-Granulates are routinely scrutinized with respect to density, elongation at break, tensile strength, humidity, particle size and sintering behaviour.

- **Semi-finished Products**

The lining is repeatedly controlled in terms of porosity, crevices and weak points by dint of spark tests following the regulation DIN 28055 Part 2. The applied voltage varies between 15-35 kV in dependence of the individual wall thickness. In supplement hereto externally manufactured semi finished items are visually inspected and dimensionally controlled.

- **Items Ready for Use**

Prior to release the concise items undergo pressure tests with 1.5-fold nominal pressure at ambient temperature.

Inspection Certificates/Reports

The manufacturing process, both the steel handling and the PTFE-lining part are regularly supervised by authorised organisations (Notified Bodies)

Welding technologies are supervised in consideration of pertinent welding Standards, such as AD-Merkblatt HP 2/1 and DIN EN 288-3; Welding approvals acc. to DIN EN 287-1 and AD-Merkblatt HP 3 are simultaneously taken into account.
Pre-requisites to grant the manufacturing of pipes, fittings and supplementary lined items meet the requirements of the Pressure Equipment Directives (PED 2014/68/EU) in conjunction with the Technical Guidelines TRR 100 and AD-Merkblatt HP 0 / DIN EN 729-3.

PED 97/23/EC-Approvals were certified repeatedly for Module A (Category I), Module A1 (Category II) and B + C1 (Category III).
Declarations of Conformity are regularly distributed together with the manufactured items.

Test Reports/Certificates

The tightness of lined flange connections meets the requirements of the German Regulation of Clean Air (Clean Air Act) Paragraph 5.2.6.4 (2002) and the VDI-Regulation (VDI 2440, Paragraph 3.3.1.4 (Nov. 2000) respectively.

Test Reports acc. to EN 10204 2.2 or else Inspection Certificates acc. to EN 10204 3.1 are available upon request at extra charge. The necessity of certificates must be declared at the point of order placement.

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PTFE-Lined Pipes and -Fittings — *Operational Limits*

Chemical Resistance

As fully fluorinated polymer PTFE features excellent chemical properties. A very few limitations, however, have to be taken into account:

- Alkali metals, such as sodium and potassium, besides alkaline-earth metals (i.e. calcium), either molten or as complex compound lead to destruction of PTFE and to degradation of the polymer structure.
- Fluorinated carbohydrates (Freon®) create swellings, occasionally even at ambient temperature. Limited exposure may turn out reversible, extended contact, however, lead to permanent volume increase with substantially restricted physical properties.
- Elementary fluorine, halogens und chlorine trifluoride reveal no detrimental effect at ambient temperature. At elevated temperature levels intensified reactions up to complete degradation will be very likely.
- Benzyl chloride, dimethylformamide and fuming nitric acid besides nitridic acid create at elevated temperatures a structural degradation..
- Monomers of Styrene, Butadiene, Acrylonitrile and further homologues tend to penetrate into the molecular structure giving rise to spontaneous polymerization leading to gain in volume and structural failure (Popcorn-Effect).
- Radiation with boosting energy of >10kGy may diminish the mechanical properties by 50% or more.

Vacuum Resistance

PTFE-lined pipes and fittings reveal limited vacuum resistance. Individual borderlines for Linings in “Standard Duty” and “Heavy Duty” are displayed underneath.

Vacuum Resistance for „Standard Duty“ PTFE-Lining; Values expressed in mbar and in kPa.

Dimension	½“	¾“	1“	1¼“	1½“	2“	2½“	3“	4“	5“	6“	8“	10“	12“
PTFE-Wall Thickness (mm)	3,0	3,0	3,0	3,0	3,0	3,0	3,5	4,0	4,5	4,5	5,0	6,0	7,0	7,0
Pressure Rating (lbs/inch²)	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Minimum Temperature (°C)	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Maximum Temperature (°C)	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Vacuum Resistance (mbar)	10	10	10	10	10	10	10	10	200	300	500	600	800	800
Vacuum Resistance (kPa)	1	1	1	1	1	1	1	1	20	30	50	60	80	80

Vacuum Resistance for “Heavy Duty” PTFE-Lining (strengthened PTFE-Wall thickness); Values expressed in mbar and kPa.

Dimension	½“	¾“	1“	1¼“	1½“	2“	2½“	3“	4“	5“	6“	8“	10“	12“
PTFE-Wall Thickness (mm)	3,0	3,0	3,0	3,0	3,0	3,0	3,5	4,0	7,0	7,0	8,0	9,5	11,0	11,0
Pressure Rating (lbs/inch²)	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Minimum Temperature (°C)	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Maximum Temperature (°C)	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Vacuum Resistance (mbar)	10	10	10	10	10	10	10	10	10	20	30	50	80	100
Vacuum Resistance (kPa)	1	1	1	1	1	1	1	1	1	2	3	5	8	10

Vacuum Resistance based upon defined operation temperatures; Values expressed in mbar.

PTFE „Standard Duty“						PTFE „Heavy Duty“								
Dimension	**½“**	**¾“**	**1“**	**1¼“**	**1½“**	**2“**	**2½“**	**3“**	**4“**	**5“**	**6“**	**8“**	**10“**	**12“**
Operation Temperature 20 °C	1	1	1	1	1	1	1	1	20	30	50	60	80	80
Operation Temperature 20 °C	1	1	1	1	1	1	1	1	1	2	3	5	8	10
Operation Temperature 50 °C	3	3	3	3	3	3	3	3	50	75	130	150	200	200
Operation Temperature 50 °C	3	3	3	3	3	3	3	3	3	5	10	15	20	30
Operation Temperature 100 °C	5	5	5	5	5	5	5	5	100	150	250	300	400	400
Operation Temperature 100 °C	5	5	5	5	5	5	5	5	5	10	15	30	40	50
Operation Temperature 150 °C	8	8	8	8	8	8	8	8	150	225	380	450	600	600
Operation Temperature 150 °C	8	8	8	8	8	8	8	8	8	15	25	40	60	80
Operation Temperature 200 °C	10	10	10	10	10	10	10	10	200	300	500	600	800	800
Operation Temperature 200 °C	10	10	10	10	10	10	10	10	10	20	30	50	80	100

Electrostatically conductive lining results in reduced vacuum resistance of approximately 15 %.

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Carbon Steel/PTFE-lined Pipes and Fittings

Assembly Instructions for ANSI 150 lbs Flanges

Assembly Instructions for PTFE-lined Pipes and Fittings

All sealing areas of PTFE-lined pipes and fittings are shielded with protecting caps for transport and storage. Protectors shall remain in their position and removed shortly before assembly.
Except for spacers (Type F) all lined items are furnished with 2.5 mm vent holes. They act as pressure release and monitoring vents in the manufacturing process and as leakage detectors during operation. Upon request, threaded couplings may become welded on top of these vent holes to grant further anti-corrosion and insulation measures. Vent holes shall be kept open to maintain its monitoring function and become blinded for exceptional applications only.
PTFE-lined items are typically assembled without supplementary gaskets. In case of transition to glass, enamel or similar piping materials, however, PTFE-sleeved gaskets should be implemented.
The tightening of bolts is recommended in crosswise sequence following the bolting torques displayed underneath. Excessive traction during tightening may give rise to deformation of sealing surfaces.

Recommended Bolting Torques

Size	ANSI 150 lbs Number of Bolts /Size of Thread	Bolting Torque [ft · lbs]	Bolting Torque [N · m]
½	4 x ½"	10	15
¾"	4 x ½"	10	22
1"	4 x ½"	10	22
1¼"	4 x ½"	10	25
1 ½"	4 x ½"	15	25
2"	4 x ⅝"	25	35
2 ½"	4 x ⅝"	33	45
3"	4 x ⅝"	40	45
4"	8 x ⅝"	30	50
5"	8 x ¾"	45	60
6"	8 x ¾"	60	70
8"	8 x ¾"	75	100
10"	12 x ⅞"	70	100
12"	12 x ⅞"	90	120

Supplementary Information:

These stated bolting torques are valid for smooth-running lubricated threads. About 24 hours after installation the applied torque values should be reapproved at operation temperature. Given bolting torques may be exceeded by 50 % without detrimental consequences.
Assuming properly assembled bolts still reveal leakage, by no means excessive torque values shall be applied as sealing measures. Instead the leaking flange connections shall be taken apart and inspected for possible unevenness, inclusions or dirt. Minor damages may be removed by means of emery paper.
Attempts to repair PTFE-Linings are objectionable.
Welding or brazing treatment of PTFE-lined piping must be declined on account of encountered liner damage.
Undue strain along the bearing areas must be avoided during assembly.
A disassembly of lined piping items shall only be considered at temperatures below 50 °C.

Tightness of Flange Connections:

Presupposing proper assembly PTFE-lined sealing areas provide perfectly tight flange connections. There is substantial proof to fulfil pertinent requirements such as the German "Clean Air Act", Paragraph 5.2.6.4 (2002) besides the Regulation VDI 2440.

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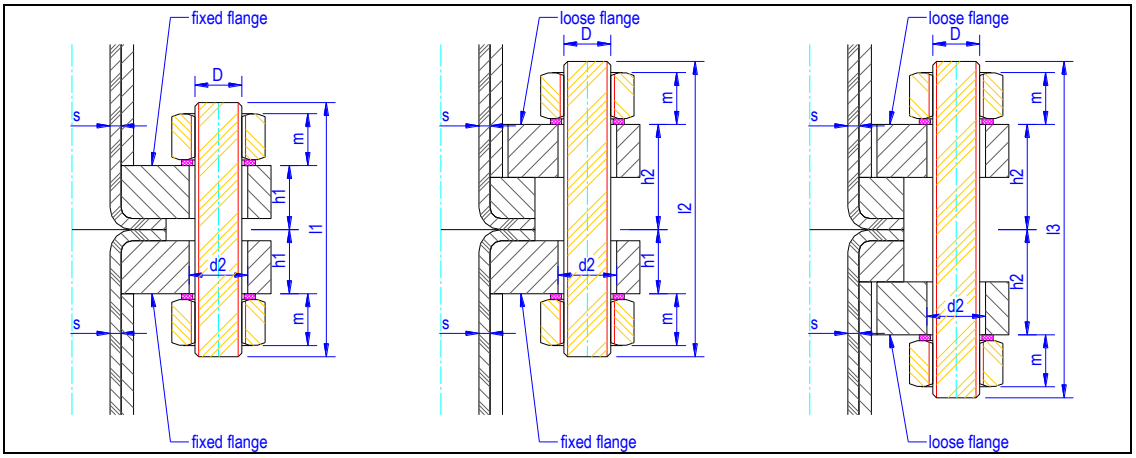
REQUIRED SIZES AND LENGTHS OF STUD BOLTS AND NUTS FOR ANSI 150 lbs. FLANGES



ANSI 150 lbs. flanges – regular PTFE-Thickness (“Standard Duty”)

DN	s	n x d2	h1	h2	D	m (ca)[1]	l1	l2	l3
½“	3	4 x 15,9	13,6	23,1	½”	14	55	65	75
¾“	3	4 x 15,9	15,2	26,3	½”	14	55	70	80
1“	3	4 x 15,9	17,3	28,4	½”	14	60	75	85
1¼“	3	4 x 15,9	18,9	30,0	½”	14	65	75	85
1½“	3	4 x 15,9	20,5	31,6	½”	14	70	80	90
2“	3	4 x 19,0	22,1	36,2	5/8”	17,5	80	90	110
2½“	3,5	4 x 19,0	25,2	39,4	5/8”	17,5	90	100	110
3“	4	4 x 19,0	26,8	42,6	5/8”	17,5	90	100	120
4“	4,5	8 x 19,0	26,8	42,6	5/8”	17,5	90	100	120
5“	4,5	8 x 22,2	26,8	44,2	¾”	21	100	110	130
6“	5	8 x 22,2	30,4	46,3	¾”	21	100	120	130
8“	6	8 x 22,2	33,1	53,7	¾”	21	110	130	150
10“	7	12 x 25,4	35,2	57,4	7/8”	24	120	140	160
12“	7	12 x 25,4	36,8	58,9	7/8”	24	120	140	160

ANSI 150 lbs. flanges – strengthened PTFE-Thickness (“Heavy Duty”)

DN	s	n x d2	h1	h2	D	m (ca)[1]	l1	l2	l3
½“	3	4 x 15,9	13,6	23,1	½”	14	55	65	75
¾“	3	4 x 15,9	15,2	26,3	½”	14	55	70	80
1“	3	4 x 15,9	17,3	28,4	½”	14	60	75	85
1¼“	3	4 x 15,9	18,9	30,0	½”	14	65	75	85
1½“	3	4 x 15,9	20,5	31,6	½”	14	70	80	90
2“	3	4 x 19,0	22,1	36,2	5/8”	17,5	80	90	110
2½“	3,5	4 x 19,0	25,2	39,4	5/8”	17,5	90	100	110
3“	4	4 x 19,0	26,8	42,6	5/8”	17,5	90	100	120
4“	7	8 x 19,0	29,3	45,1	5/8”	17,5	90	110	130
5“	7	8 x 22,2	29,3	46,7	¾”	21	100	120	140
6“	8	8 x 22,2	33,4	49,3	¾”	21	110	120	140
8“	9,5	8 x 22,2	36,6	57,2	¾”	21	120	140	160
10“	11	12 x 25,4	39,2	61,4	7/8”	24	130	150	170
12“	11	12 x 25,4	40,8	62,9	7/8”	24	130	150	170

*) Including washer and heavy hexagonal nuts

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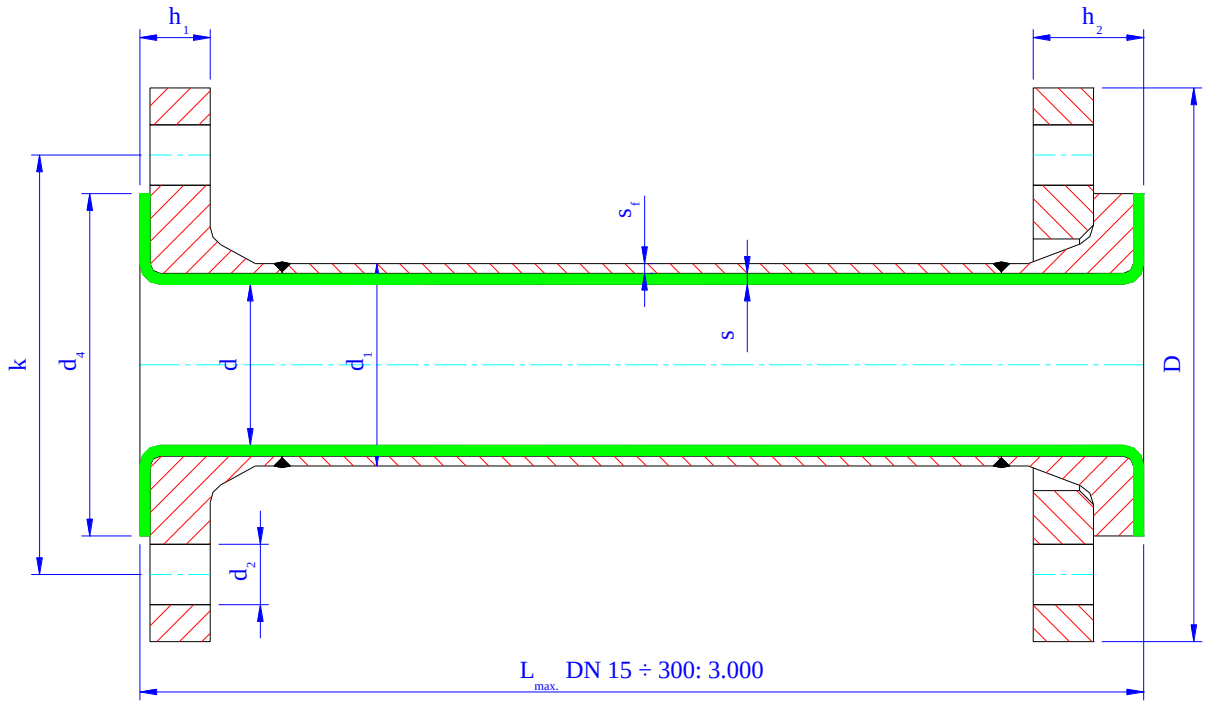
FLANGED PIPE according to ANSI B 16.5 Class 150

Material specification: Tubes: ASTM A 106 Grade B according to ANSI B 36.10
API 5L Grade B according to ANSI B 36.10
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894 - 4895
Delivery terms: according to DIN 2874

Dimensions expressed in mm



DN	d_1	s_f	d	s	n x d_2	d_4	k	D	h_1	h_2
½“	24.0	3.00	12	3	4 x 15.9	35	60.3	88.9	13.6	23.1
¾“	24.0	3.00	12	3	4 x 15.9	43	69.8	98.4	15.2	26.3
1“	33.4	3.38	19	3	4 x 15.9	51	79.4	107.9	17.3	28.4
1¼“	42.2	3.56	28	3	4 x 15.9	64	88.9	117.5	18.9	30.0
1½“	48.3	3.68	32	3	4 x 15.9	73	98.4	127.0	20.5	31.6
2“	60.3	3.91	44	3	4 x 19.0	92	120.6	152.4	22.1	36.2
2½“	73.0	5.16	61	3.5	4 x 19.0	105	139.7	177.8	25.2	39.4
3“	88.9	5.49	69	4	4 x 19.0	127	152.4	190.5	26.8	42.6
4“	114.3	6.02	94	4.5	8 x 19.0	157	190.5	228.6	26.8	42.6
5“	141.3	6.55	121	4.5	8 x 22.2	185	215.9	254.0	26.8	44.2
6“	168.3	7.11	144	5	8 x 22.2	216	241.3	279.4	30.4	46.3
8“	219.1	6.35	194	6	8 x 22.2	270	298.4	342.9	33.1	53.7
10“	273.0	6.35	246	7	12 x 25.4	324	361.9	406.4	35.2	57.4
12”	323.8	6.35	297	7	12 x 25.4	381	431.8	482.6	36.8	58.9
16”	406.4	7.9	374	8	16 x 28.6	470	539.7	596.9	44.6	68.6
20“	508.0	11.0	468	9	20 x 31.7	585	635.0	698.5	52.0	78.0

Steel tubes acc. to Schedule 40 up to 6” (included) and Schedule 20 from 8” to 20” respectively
Upon demand “Heavy Duty” linings for vacuum services
Vent holes upon operator’s request

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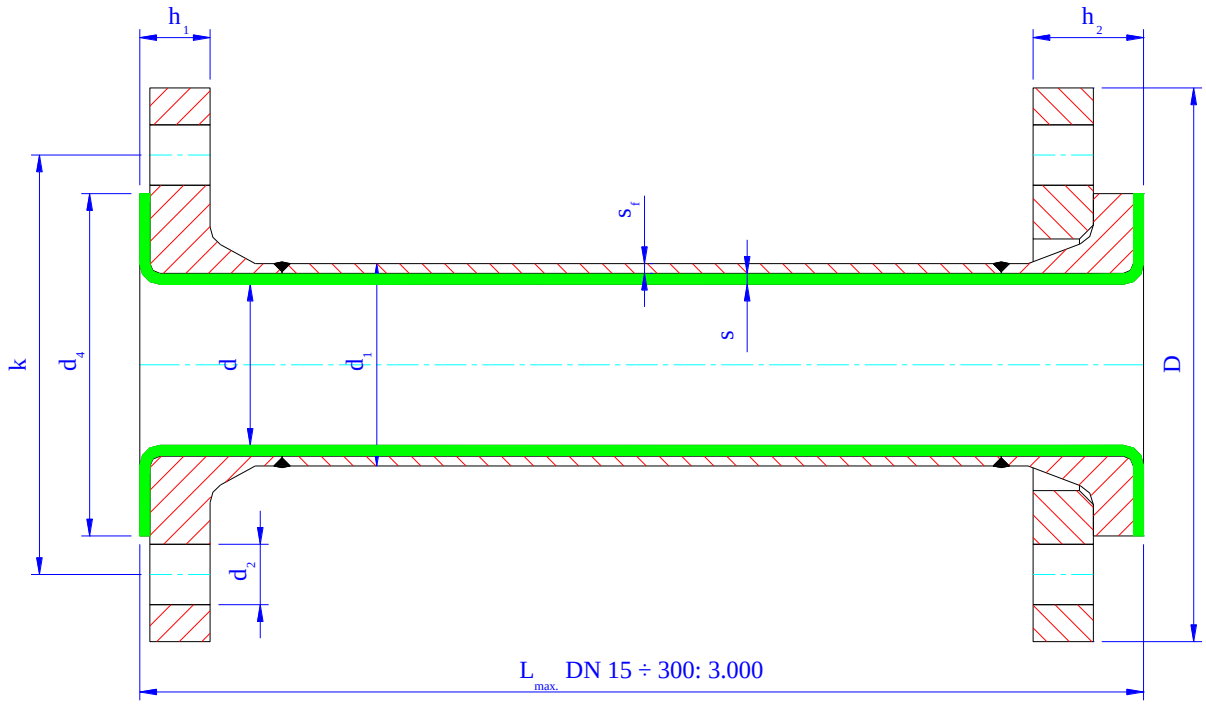
FLANGED PIPE according to ANSI B 16.5 Class 150 – Heavy Duty

Material specification: Tubes: ASTM A 106 Grade B according to ANSI B 36.10
API 5L Grade B according to ANSI B 36.10
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894 - 4895
Delivery terms: according to DIN 2874

Dimensions expressed in mm



DN	d_1	s_f	d	s	n x d_2	d_4	k	D	h_1	h_2
½“	24.0	3.00	12	3	4 x 15.9	35	60.3	88.9	13.6	23.1
¾“	24.0	3.00	12	3	4 x 15.9	43	69.8	98.4	15.2	26.3
1“	33.4	3.38	19	3.5	4 x 15.9	51	79.4	107.9	17.3	28.4
1¼“	42.2	3.56	28	3.5	4 x 15.9	64	88.9	117.5	18.9	30.0
1½“	48.3	3.68	32	3.5	4 x 15.9	73	98.4	127.0	20.5	31.6
2“	60.3	3.91	44	3.5	4 x 19.0	92	120.6	152.4	22.1	36.2
2½“	73.0	5.16	61	3.5	4 x 19.0	105	139.7	177.8	25.2	39.4
3“	88.9	5.49	69	4.5	4 x 19.0	127	152.4	190.5	26.8	42.6
4“	114.3	6.02	94	7	8 x 19.0	157	190.5	228.6	26.8	42.6
5“	141.3	6.55	121	7	8 x 22.2	185	215.9	254.0	26.8	44.2
6“	168.3	7.11	144	8	8 x 22.2	216	241.3	279.4	30.4	46.3
8“	219.1	6.35	194	9.5	8 x 22.2	270	298.4	342.9	33.1	53.7
10“	273.0	6.35	246	11	12 x 25.4	324	361.9	406.4	35.2	57.4
12”	323.8	6.35	297	11	12 x 25.4	381	431.8	482.6	36.8	58.9
16”	406.4	7.9	374	12	16 x 28.6	470	539.7	596.9	44.6	68.6
20“	508.0	11.0	468	12	20 x 31.7	585	635.0	698.5	52.0	78.0

Steel tubes acc. to Schedule 40 up to 6” (included) and Schedule 20 from 8” to 20” respectively
Upon demand “Heavy Duty” linings for vacuum services
Vent holes upon operator’s request

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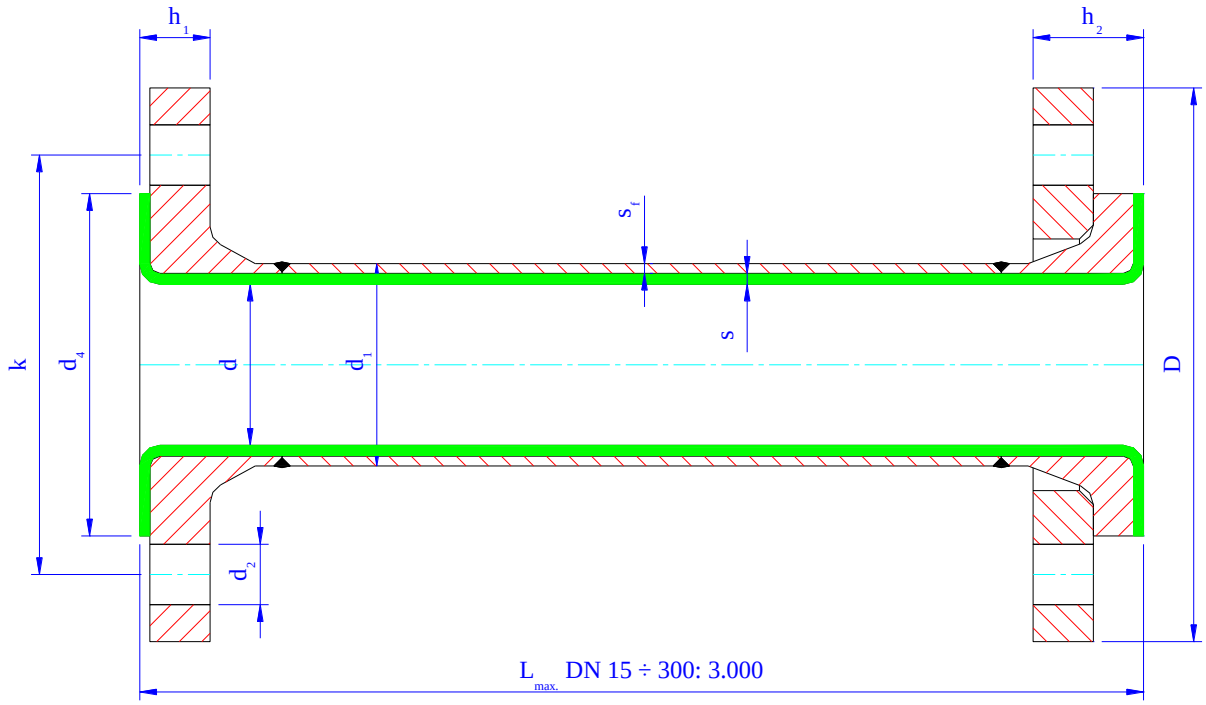
FLANGED PIPE acc. to ANSI B 16.5 Class 150 - Heavy Duty - Low Temperature

Material specification:	Tubes:	ASTM A 333 Grade 6 according to ANSI B 36.10
	Flanges:	ASTM A 350-LF2 according to ANSI B 16.5
	Stub-Ends:	ASTM A 350-LF2 Class 1 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
Delivery terms:		according to DIN 2874

Dimensions expressed in mm



DN	d_1	s_f	d	s	n x d_2	d_4	k	D	h_1	h_2
½“	24.0	3.00	12	3	4 x 15.9	35	60.3	88.9	13.6	23.1
¾“	24.0	3.00	12	3	4 x 15.9	43	69.8	98.4	15.2	26.3
1“	33.4	3.38	19	3.5	4 x 15.9	51	79.4	107.9	17.3	28.4
1¼“	42.2	3.56	28	3.5	4 x 15.9	64	88.9	117.5	18.9	30.0
1½“	48.3	3.68	32	3.5	4 x 15.9	73	98.4	127.0	20.5	31.6
2“	60.3	3.91	44	3.5	4 x 19.0	92	120.6	152.4	22.1	36.2
2½“	73.0	5.16	61	3.5	4 x 19.0	105	139.7	177.8	25.2	39.4
3“	88.9	5.49	69	4.5	4 x 19.0	127	152.4	190.5	26.8	42.6
4“	114.3	6.02	94	7	8 x 19.0	157	190.5	228.6	26.8	42.6
5“	141.3	6.55	121	7	8 x 22.2	185	215.9	254.0	26.8	44.2
6“	168.3	7.11	144	8	8 x 22.2	216	241.3	279.4	30.4	46.3
8“	219.1	6.35	194	9.5	8 x 22.2	270	298.4	342.9	33.1	53.7
10“	273.0	6.35	246	11	12 x 25.4	324	361.9	406.4	35.2	57.4
12”	323.8	6.35	297	11	12 x 25.4	381	431.8	482.6	36.8	58.9
16”	406.4	7.9	374	12	16 x 28.6	470	539.7	596.9	44.6	68.6
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Steel tubes acc. to Schedule 40 up to 6” and Schedule 20 from 8” to 20” respectively
Upon demand “Heavy Duty” linings for vacuum services
Vent holes upon operator’s request

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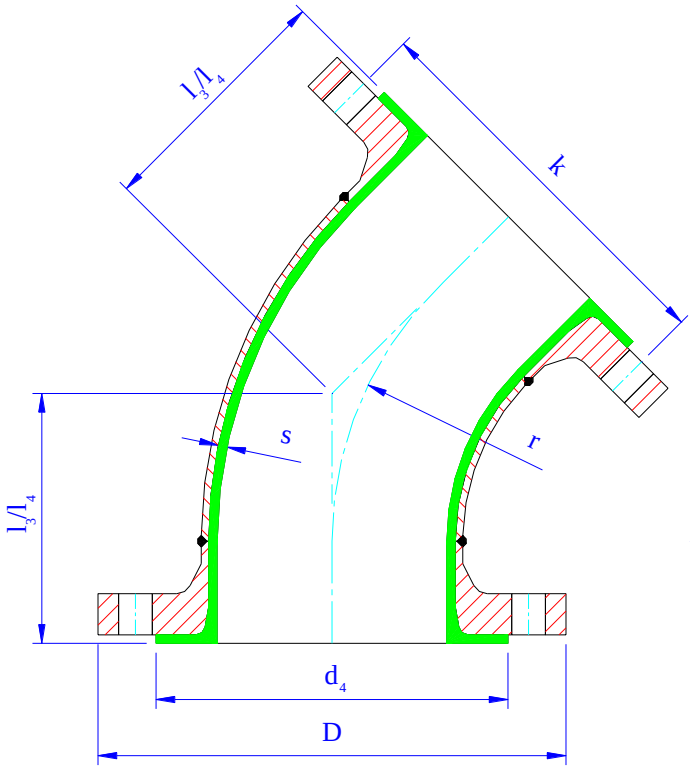
FLANGED 45° BEND according to ANSI B 16.5 Class 150

Material specification:
Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm



DN	s	Elbow Type	r	l_3	l_4	d_4	k	D
½“	3	L. R.	38.1		45	35	60.3	88.9
¾“	3	L. R.	28.6		45	43	69.8	98.4
1“	3	L. R.	38.1		45	51	79.4	107.9
1¼“	3	L. R.	47.6		51	64	88.9	117.5
1½“	3	L. R.	57.2		57	73	98.4	127.0
2“	3	L. R.	50.8	64		92	120.6	152.4
2½“	3.5	S. R.	63.5	76		105	139.7	177.8
3“	4	S. R.	76.2	76		127	152.4	190.5
4“	4.5	S. R.	101.6	102		157	190.5	228.6
5“	4.5	S. R.	127.0	114		185	215.9	254.0
6“	5	S. R.	152.4	127		216	241.3	279.4
8“	6	S. R.	203.2	140		270	298.4	342.9
10“	7	S. R.	254.0	165		324	361.9	406.4
12“	7	S. R.	304.8	190		381	431.8	482.6

On demand “Heavy Duty” lining available for vacuum services
Steel frames according to Schedule 40
Bends with individual angle degrees available upon request
Vent holes upon operator’s request

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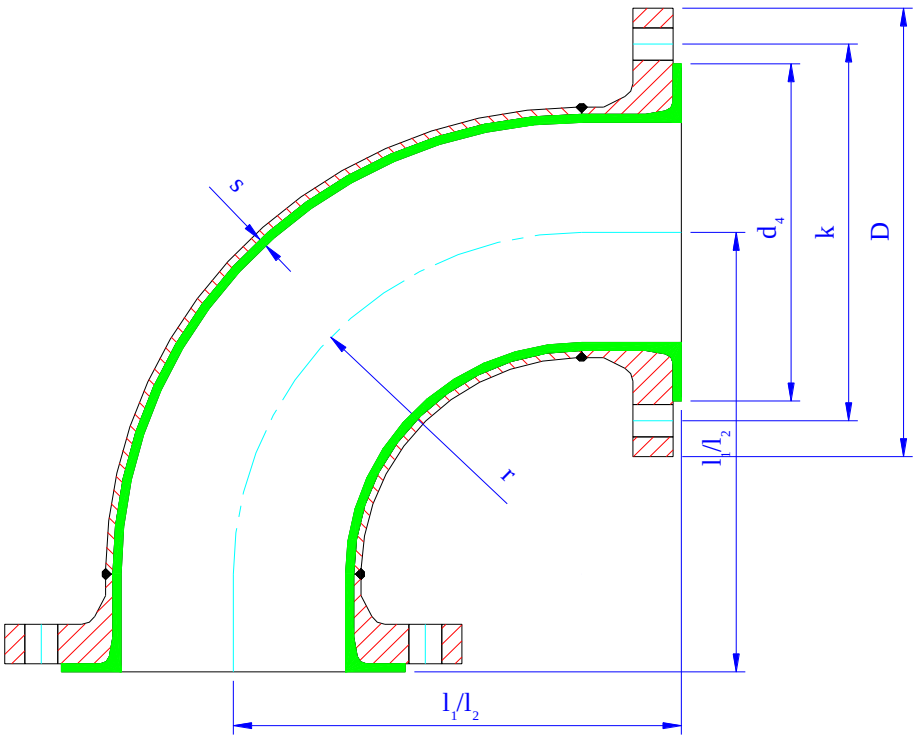
FLANGED 90° BEND according to ANSI B 16.5 Class 150

Material specification:	Steel frame:	ASTM A 234 Grade WPB according to ANSI B 16.28
	Flanges:	ASTM A 105 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
Delivery terms:		according to DIN 2874

Dimensions expressed in mm



DN	s	Elbow Type	r	l_1	l_2	d_4	k	D
½“	3	L. R.	38.1		65	35	60.3	88.9
¾“	3	L. R.	28.6		75	43	69.8	98.4
1“	3	L. R.	38.1		89	51	79.4	107.9
1¼“	3	L. R.	47.6		95	64	88.9	117.5
1½“	3	L. R.	57.2		102	73	98.4	127.0
2“	3	L. R.	50.8	114		92	120.6	152.4
2½“	3.5	S. R.	63.5	127		105	139.7	177.8
3“	4	S. R.	76.2	140		127	152.4	190.5
4“	4.5	S. R.	101.6	165		157	190.5	228.6
5“	4.5	S. R.	127.0	190		185	215.9	254.0
6“	5	S. R.	152.4	203		216	241.3	279.4
8“	6	S. R.	203.2	229		270	298.4	342.9
10“	7	S. R.	254.0	279		324	361.9	406.4
12“	7	S. R.	304.8	305		381	431.8	482.6

Upon demand “Heavy Duty” linings for vacuum services
Steel frames according to Schedule 40
On request bends with individual angles
Vent holes upon operator’s request

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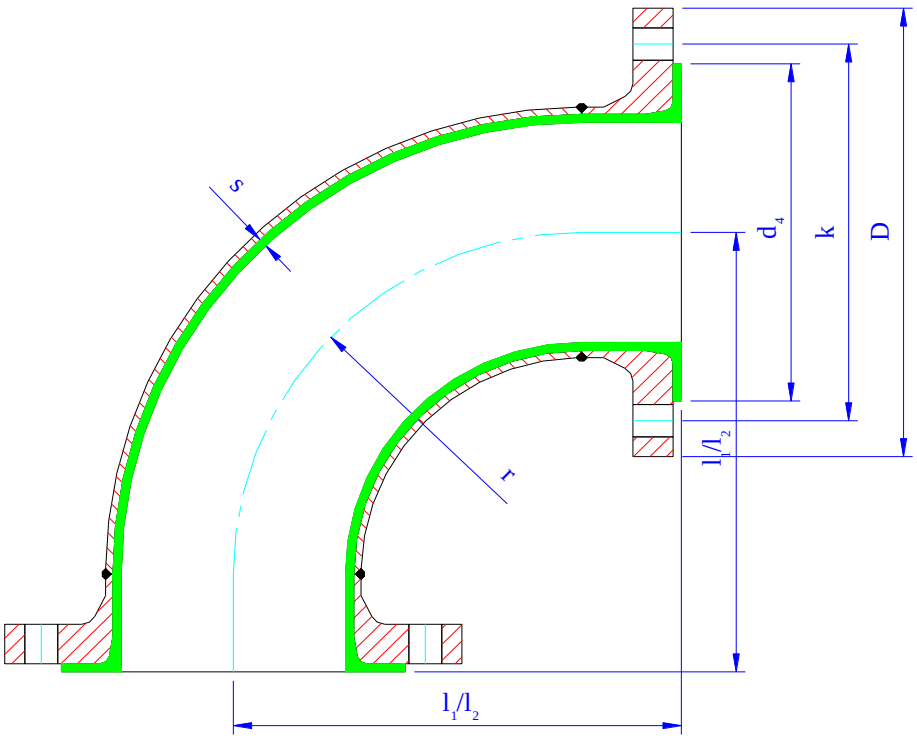
FLANGED 90° BEND according to ANSI B 16.5 Class 150 – Heavy Duty

Material specification:	Steel frame:	ASTM A 234 Grade WPB according to ANSI B 16.28
	Flanges:	ASTM A 105 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
Delivery terms:		according to DIN 2874

Dimensions expressed in mm



DN	s	Elbow Type	r	l_1	l_2	d_4	k	D
½“	3	L. R.	38.1		65	35	60.3	88.9
¾“	3	L. R.	28.6		75	43	69.8	98.4
1“	3.5	L. R.	38.1		89	51	79.4	107.9
1¼“	3.5	L. R.	47.6		95	64	88.9	117.5
1½“	3.5	L. R.	57.2		102	73	98.4	127.0
2“	3.5	L. R.	50.8	114		92	120.6	152.4
2½“	3.5	S. R.	63.5	127		105	139.7	177.8
3“	4	S. R.	76.2	140		127	152.4	190.5
4“	7	S. R.	101.6	165		157	190.5	228.6
5“	7	S. R.	127.0	190		185	215.9	254.0
6“	8	S. R.	152.4	203		216	241.3	279.4
8“	9.5	S. R.	203.2	229		270	298.4	342.9
10“	11	S. R.	254.0	279		324	361.9	406.4
12“	11	S. R.	304.8	305		381	431.8	482.6

Upon demand “Heavy Duty” linings for vacuum services
Steel frames according to Schedule 40
On request bends with individual angles
Vent holes upon operator’s request

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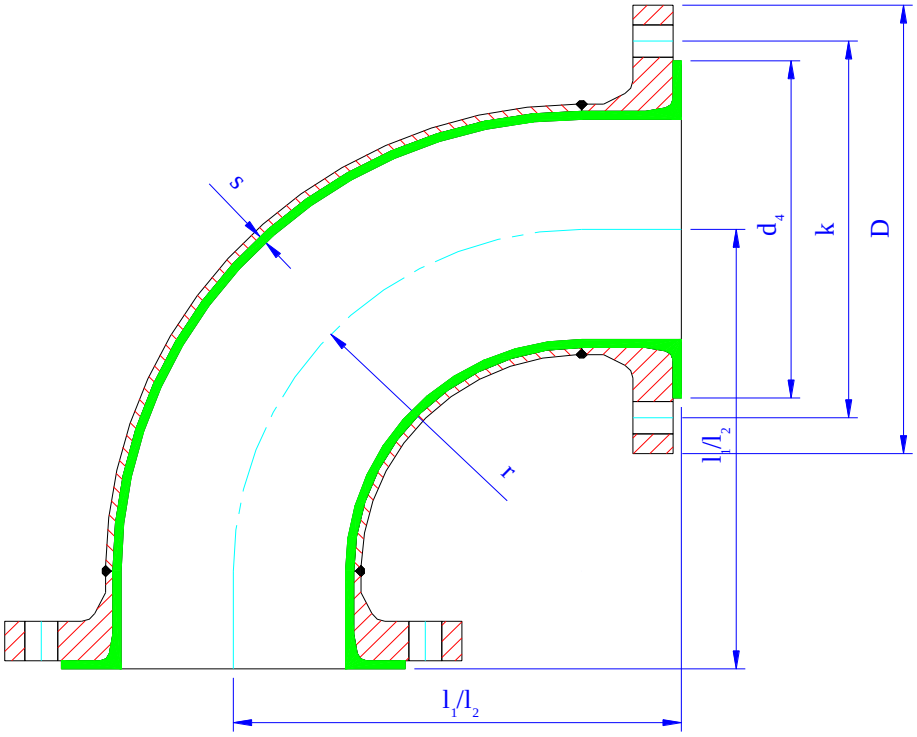
90° ELBOW acc. to ANSI B 16.5 Class 150 – Heavy Duty – Low Temperature

Material specification:	Steel frame:	ASTM A 420 Grade WPL 6 according to ANSI B 16.28
	Flanges:	ASTM A 350-LF2 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
Delivery terms:		according to DIN 2874

Dimensions expressed in mm



DN	s	Elbow Type	r	l_1	l_2	d_4	k	D
½“	3	L. R.	38.1		65	35	60.3	88.9
¾“	3	L. R.	28.6		75	43	69.8	98.4
1“	3.5	L. R.	38.1		89	51	79.4	107.9
1¼“	3.5	L. R.	47.6		95	64	88.9	117.5
1½“	3.5	L. R.	57.2		102	73	98.4	127.0
2“	3.5	L. R.	50.8	114		92	120.6	152.4
2½“	3.5	S. R.	63.5	127		105	139.7	177.8
3“	4	S. R.	76.2	140		127	152.4	190.5
4“	7	S. R.	101.6	165		157	190.5	228.6
5“	7	S. R.	127.0	190		185	215.9	254.0
6“	8	S. R.	152.4	203		216	241.3	279.4
8“	9.5	S. R.	203.2	229		270	298.4	342.9
10“	11	S. R.	254.0	279		324	361.9	406.4
12“	11	S. R.	304.8	305		381	431.8	482.6

Upon demand “Heavy Duty” linings for vacuum services
Steel frames according to Schedule 40
On request bends with individual angles
Vent holes upon operator’s request

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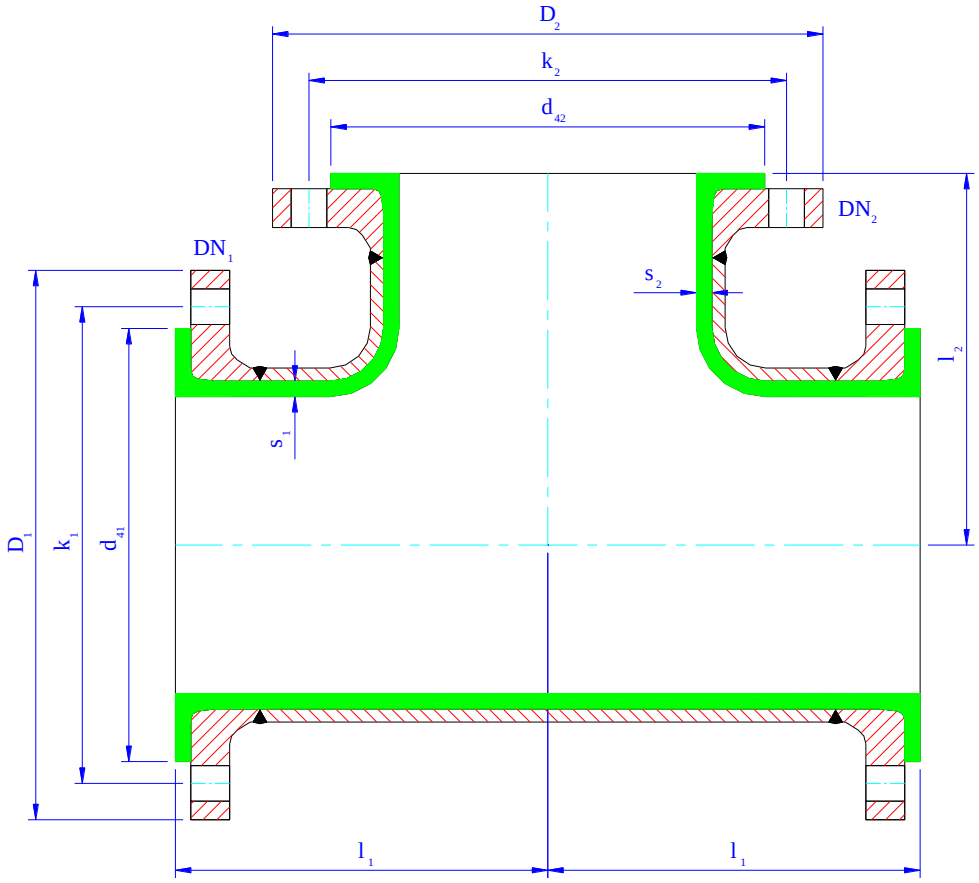
EQUAL AND REDUCING TEES according to ANSI B 16.5 class 150

Material specification: Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm



DN1	s1	l1	d41	k1	D1	DN2	s2	l2	d42	k2	D2
½”	3	65	35	60.3	88.9	½”					
¾”	3	75	43	69.8	98.4	¾”					
¾”	3	75	43	69.8	98.4	½”	3	75	35	60.3	88.9
1”	3	89	51	79.4	107.9	1”					
1”	3	89	51	79.4	107.9	¾”	3	89	43	69.8	98.4
1”	3	89	51	79.4	107.9	½”	3	89	35	60.3	88.9
1¼”	3	95	64	88.9	117.5	1¼”					
1¼”	3	95	64	88.9	117.5	1”	3	95	51	79.4	107.9
1¼”	3	95	64	88.9	117.5	¾”	3	95	43	69.8	98.4
1¼”	3	95	64	88.9	117.5	½”	3	95	35	60.3	88.9
1½”	3	102	73	98.4	127.0	1½”					
1½”	3	102	73	98.4	127.0	1¼”	3	102	64	88.9	117.5
1½”	3	102	73	98.4	127.0	1”	3	102	51	79.4	107.9
1½”	3	102	73	98.4	127.0	¾”	3	102	43	69.8	98.4
1½”	3	102	73	98.4	127.0	½”	3	102	35	60.3	88.9

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EQUAL AND REDUCING TEES according to ANSI B 16.5 Class 150

Material specification: Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
2”	3	114	92	120.6	152.4	2”					
2”	3	114	92	120.6	152.4	1½”	3	114	73	98.4	127.0
2”	3	114	92	120.6	152.4	1¼”	3	114	64	88.9	117.5
2”	3	114	92	120.6	152.4	1”	3	114	51	79.4	107.9
2”	3	114	92	120.6	152.4	¾”	3	114	43	69.8	98.4
2”	3	114	92	120.6	152.4	½”	3	114	35	60.3	88.9
2½”	3.5	127	105	139.7	177.8	2½”					
2½”	3.5	127	105	139.7	177.8	2”	3	127	92	120.6	152.4
2½”	3.5	127	105	139.7	177.8	1½”	3	127	73	98.4	127.0
2½”	3.5	127	105	139.7	177.8	1¼”	3	127	64	88.9	117.5
2½”	3.5	127	105	139.7	177.8	1”	3	127	51	79.4	107.9
2½”	3.5	127	105	139.7	177.8	¾”	3	127	43	69.8	98.4
2½”	3.5	127	105	139.7	177.8	½”	3	127	35	60.3	88.9
3”	4	140	127	152.4	190.5	3”					
3”	4	140	127	152.4	190.5	2½”	3.5	140	105	139.7	177.8
3”	4	140	127	152.4	190.5	2”	3	140	92	120.6	152.4
3”	4	140	127	152.4	190.5	1½”	3	140	73	98.4	127.0
3”	4	140	127	152.4	190.5	1¼”	3	140	64	88.9	117.5
3”	4	140	127	152.4	190.5	1”	3	140	51	79.4	107.9
3”	4	140	127	152.4	190.5	¾”	3	140	43	69.8	98.4
3”	4	140	127	152.4	190.5	½”	3	140	35	60.3	88.9
4”	4.5	165	157	190.5	228.6	4”					
4”	4.5	165	157	190.5	228.6	3”	4	165	127	152.4	190.5
4”	4.5	165	157	190.5	228.6	2½”	3.5	165	105	139.7	177.8
4”	4.5	165	157	190.5	228.6	2”	3	165	92	120.6	152.4
4”	4.5	165	157	190.5	228.6	1½”	3	165	73	98.4	127.0
4”	4.5	165	157	190.5	228.6	1¼”	3	165	64	88.9	117.5
4”	4.5	165	157	190.5	228.6	1”	3	165	51	79.4	107.9
4”	4.5	165	157	190.5	228.6	¾”	3	165	43	69.8	98.4
4”	4.5	165	157	190.5	228.6	½”	3	165	35	60.3	88.9
5”	4.5	190	185	215.9	254.0	5”					
5”	4.5	190	185	215.9	254.0	4”	4.5	190	157	190.5	228.6
5”	4.5	190	185	215.9	254.0	3”	4	190	127	152.4	190.5
5”	4.5	190	185	215.9	254.0	2½”	3.5	190	105	139.7	177.8
5”	4.5	190	185	215.9	254.0	2”	3	190	92	120.6	152.4
5”	4.5	190	185	215.9	254.0	1½”	3	190	73	98.4	127.0
5”	4.5	190	185	215.9	254.0	1¼”	3	190	64	88.9	117.5
5”	4.5	190	185	215.9	254.0	1”	3	190	51	79.4	107.9

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EQUAL AND REDUCING TEES according to ANSI B 16.5 class 150

Material specification: Steel frame: ASTM A 234 Grade WPB, according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
6”	5	203	216	241.3	279.4	6”					
6”	5	203	216	241.3	279.4	5”	4.5	203	185	215.9	254.0
6”	5	203	216	241.3	279.4	4”	4.5	203	157	190.5	228.6
6”	5	203	216	241.3	279.4	3”	4	203	127	152.4	190.5
6”	5	203	216	241.3	279.4	2½”	3.5	203	105	139.7	177.8
6”	5	203	216	241.3	279.4	2”	3	203	92	120.6	152.4
6”	5	203	216	241.3	279.4	1½”	3	203	73	98.4	127.0
6”	5	203	216	241.3	279.4	1¼”	3	203	64	88.9	117.5
6”	5	203	216	241.3	279.4	1”	3	203	51	79.4	107.9
8”	6	229	270	298.4	342.9	8”					
8”	6	229	270	298.4	342.9	6”	5	229	216	241.3	279.4
8”	6	229	270	298.4	342.9	5”	4.5	229	185	215.9	254.0
8”	6	229	270	298.4	342.9	4”	4.5	229	157	190.5	228.6
8”	6	229	270	298.4	342.9	3”	4	229	127	152.4	190.5
8”	6	229	270	298.4	342.9	2½”	3.5	229	105	139.7	177.8
8”	6	229	270	298.4	342.9	2”	3	229	92	120.6	152.4
10”	7	279	324	361.9	406.4	10”					
10”	7	279	324	361.9	406.4	8”	6	279	270	298.4	342.9
10”	7	279	324	361.9	406.4	6”	5	279	216	241.3	279.4
10”	7	279	324	361.9	406.4	5”	4.5	279	185	215.9	254.0
10”	7	279	324	361.9	406.4	4”	4.5	279	157	190.5	228.6
10”	7	279	324	361.9	406.4	3”	4	279	127	152.4	190.5
10”	7	279	324	361.9	406.4	2½”	3.5	279	105	139.7	177.8
10”	7	279	324	361.9	406.4	2”	3	279	92	120.6	152.4
12”	7	305	381	431.8	482.6	12”					
12”	7	305	381	431.8	482.6	10”	7	305	324	361.9	406.4
12”	7	305	381	431.8	482.6	8”	6	305	270	298.4	342.9
12”	7	305	381	431.8	482.6	6”	5	305	216	241.3	279.4
12”	7	305	381	431.8	482.6	5”	4.5	305	185	215.9	254.0
12”	7	305	381	431.8	482.6	4”	4.5	305	157	190.5	228.6
12”	7	305	381	431.8	482.6	3”	4	305	127	152.4	190.5
12”	7	305	381	431.8	482.6	2½”	3.5	305	105	139.7	177.8
12”	7	305	381	431.8	482.6	2”	3	305	92	120.6	152.4

Upon demand “Heavy Duty” lining for vacuum services
Steel frames according to Schedule 40
Vent holes upon operator’s request

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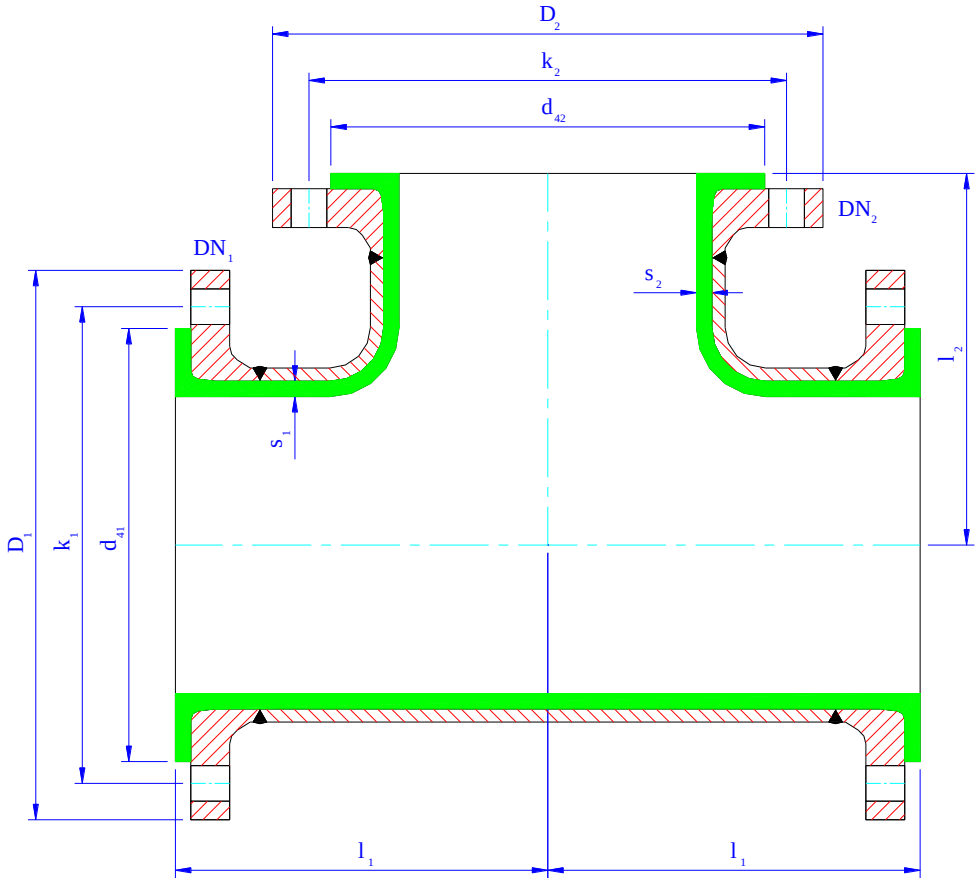
EQUAL AND REDUCING TEES according to ANSI B 16.5 class 150 - Heavy Duty

Material specification: Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm



DN1	s1	l1	d41	k1	D1	DN2	s2	l2	d42	k2	D2
½”	3	65	35	60.3	88.9	½”					
¾”	3	75	43	69.8	98.4	¾”					
¾”	3	75	43	69.8	98.4	½”	3	75	35	60.3	88.9
1”	3.5	89	51	79.4	107.9	1”					
1”	3.5	89	51	79.4	107.9	¾”	3	89	43	69.8	98.4
1”	3.5	89	51	79.4	107.9	½”	3	89	35	60.3	88.9
1¼”	3.5	95	64	88.9	117.5	1¼”					
1¼”	3.5	95	64	88.9	117.5	1”	3	95	51	79.4	107.9
1¼”	3.5	95	64	88.9	117.5	¾”	3	95	43	69.8	98.4
1¼”	3.5	95	64	88.9	117.5	½”	3	95	35	60.3	88.9
1½”	3.5	102	73	98.4	127.0	1½”					
1½”	3.5	102	73	98.4	127.0	1¼”	3	102	64	88.9	117.5
1½”	3.5	102	73	98.4	127.0	1”	3	102	51	79.4	107.9
1½”	3.5	102	73	98.4	127.0	¾”	3	102	43	69.8	98.4
1½”	3.5	102	73	98.4	127.0	½”	3	102	35	60.3	88.9

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EQUAL AND REDUCING TEES according to ANSI B 16.5 Class 150 – Heavy Duty

Material specification: Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
2”	3.5	114	92	120.6	152.4	2”					
2”	3.5	114	92	120.6	152.4	1½”	3	114	73	98.4	127.0
2”	3.5	114	92	120.6	152.4	1¼”	3	114	64	88.9	117.5
2”	3.5	114	92	120.6	152.4	1”	3	114	51	79.4	107.9
2”	3.5	114	92	120.6	152.4	¾”	3	114	43	69.8	98.4
2”	3.5	114	92	120.6	152.4	½”	3	114	35	60.3	88.9
2½”	3.5	127	105	139.7	177.8	2½”					
2½”	3.5	127	105	139.7	177.8	2”	3	127	92	120.6	152.4
2½”	3.5	127	105	139.7	177.8	1½”	3	127	73	98.4	127.0
2½”	3.5	127	105	139.7	177.8	1¼”	3	127	64	88.9	117.5
2½”	3.5	127	105	139.7	177.8	1”	3	127	51	79.4	107.9
2½”	3.5	127	105	139.7	177.8	¾”	3	127	43	69.8	98.4
2½”	3.5	127	105	139.7	177.8	½”	3	127	35	60.3	88.9
3”	4.5	140	127	152.4	190.5	3”					
3”	4.5	140	127	152.4	190.5	2½”	3.5	140	105	139.7	177.8
3”	4.5	140	127	152.4	190.5	2”	3	140	92	120.6	152.4
3”	4.5	140	127	152.4	190.5	1½”	3	140	73	98.4	127.0
3”	4.5	140	127	152.4	190.5	1¼”	3	140	64	88.9	117.5
3”	4.5	140	127	152.4	190.5	1”	3	140	51	79.4	107.9
3”	4.5	140	127	152.4	190.5	¾”	3	140	43	69.8	98.4
3”	4.5	140	127	152.4	190.5	½”	3	140	35	60.3	88.9
4”	7	165	157	190.5	228.6	4”					
4”	7	165	157	190.5	228.6	3”	4	165	127	152.4	190.5
4”	7	165	157	190.5	228.6	2½”	3.5	165	105	139.7	177.8
4”	7	165	157	190.5	228.6	2”	3	165	92	120.6	152.4
4”	7	165	157	190.5	228.6	1½”	3	165	73	98.4	127.0
4”	7	165	157	190.5	228.6	1¼”	3	165	64	88.9	117.5
4”	7	165	157	190.5	228.6	1”	3	165	51	79.4	107.9
4”	7	165	157	190.5	228.6	¾”	3	165	43	69.8	98.4
4”	7	165	157	190.5	228.6	½”	3	165	35	60.3	88.9
5”	7	190	185	215.9	254.0	5”					
5”	7	190	185	215.9	254.0	4”	4.5	190	157	190.5	228.6
5”	7	190	185	215.9	254.0	3”	4	190	127	152.4	190.5
5”	7	190	185	215.9	254.0	2½”	3.5	190	105	139.7	177.8
5”	7	190	185	215.9	254.0	2”	3	190	92	120.6	152.4
5”	7	190	185	215.9	254.0	1½”	3	190	73	98.4	127.0
5”	7	190	185	215.9	254.0	1¼”	3	190	64	88.9	117.5
5”	7	190	185	215.9	254.0	1”	3	190	51	79.4	107.9

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EQUAL AND REDUCING TEES according to ANSI B 16.5 class 150 – Heavy Duty

Material specification: Steel frame: ASTM A 234 Grade WPB, according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
6”	8	203	216	241.3	279.4	6”					
6”	8	203	216	241.3	279.4	5”	4.5	203	185	215.9	254.0
6”	8	203	216	241.3	279.4	4”	4.5	203	157	190.5	228.6
6”	8	203	216	241.3	279.4	3”	4	203	127	152.4	190.5
6”	8	203	216	241.3	279.4	2½”	3.5	203	105	139.7	177.8
6”	8	203	216	241.3	279.4	2”	3	203	92	120.6	152.4
6”	8	203	216	241.3	279.4	1½”	3	203	73	98.4	127.0
6”	8	203	216	241.3	279.4	1¼”	3	203	64	88.9	117.5
6”	8	203	216	241.3	279.4	1”	3	203	51	79.4	107.9
8”	9.5	229	270	298.4	342.9	8”					
8”	9.5	229	270	298.4	342.9	6”	5	229	216	241.3	279.4
8”	9.5	229	270	298.4	342.9	5”	4.5	229	185	215.9	254.0
8”	9.5	229	270	298.4	342.9	4”	4.5	229	157	190.5	228.6
8”	9.5	229	270	298.4	342.9	3”	4	229	127	152.4	190.5
8”	9.5	229	270	298.4	342.9	2½”	3.5	229	105	139.7	177.8
8”	9.5	229	270	298.4	342.9	2”	3	229	92	120.6	152.4
10”	11	279	324	361.9	406.4	10”					
10”	11	279	324	361.9	406.4	8”	6	279	270	298.4	342.9
10”	11	279	324	361.9	406.4	6”	5	279	216	241.3	279.4
10”	11	279	324	361.9	406.4	5”	4.5	279	185	215.9	254.0
10”	11	279	324	361.9	406.4	4”	4.5	279	157	190.5	228.6
10”	11	279	324	361.9	406.4	3”	4	279	127	152.4	190.5
10”	11	279	324	361.9	406.4	2½”	3.5	279	105	139.7	177.8
10”	11	279	324	361.9	406.4	2”	3	279	92	120.6	152.4
12”	11	305	381	431.8	482.6	12”					
12”	11	305	381	431.8	482.6	10”	7	305	324	361.9	406.4
12”	11	305	381	431.8	482.6	8”	6	305	270	298.4	342.9
12”	11	305	381	431.8	482.6	6”	5	305	216	241.3	279.4
12”	11	305	381	431.8	482.6	5”	4.5	305	185	215.9	254.0
12”	11	305	381	431.8	482.6	4”	4.5	305	157	190.5	228.6
12”	11	305	381	431.8	482.6	3”	4	305	127	152.4	190.5
12”	11	305	381	431.8	482.6	2½”	3.5	305	105	139.7	177.8
12”	11	305	381	431.8	482.6	2”	3	305	92	120.6	152.4

Upon demand “Heavy Duty” lining for vacuum services
Steel frames according to Schedule 40
Vent holes upon operator’s request

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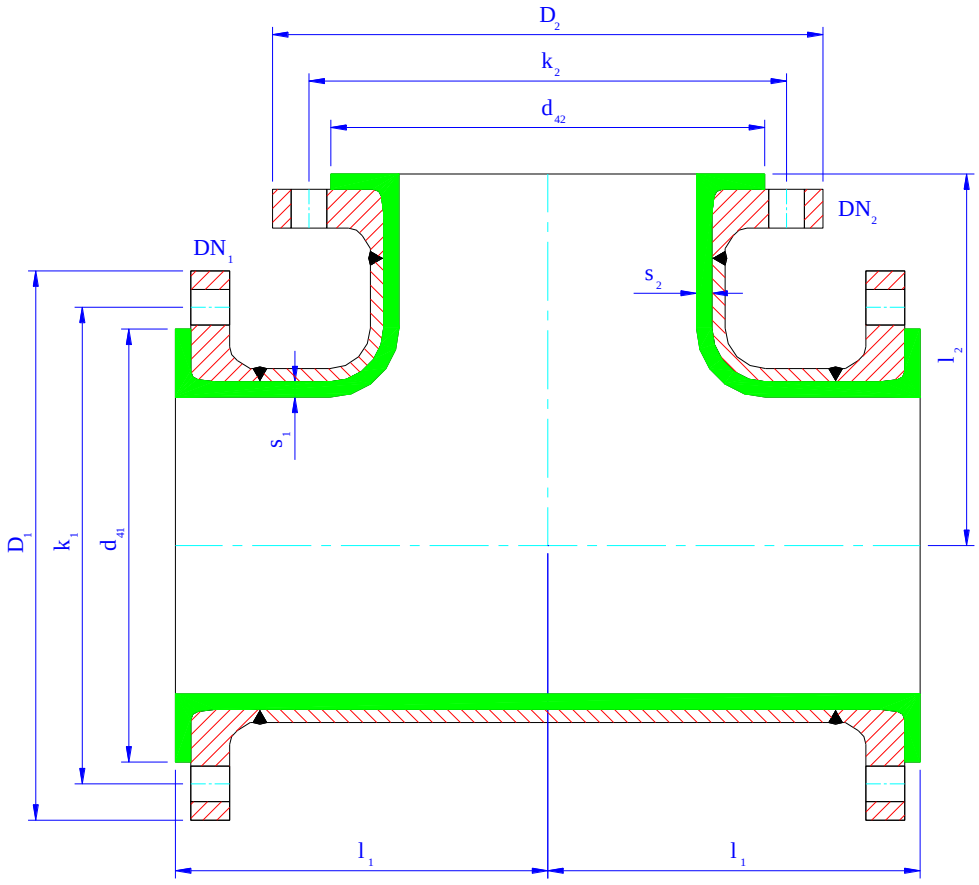
EQUAL/REDUCING TEES according to ANSI B 16.5 class 150 - Heavy Duty - Low Temperature

Material specification: Steel frame: ASTM A 420 Grade WPL 6 according to ANSI B 16.28
Flanges: ASTM A 350-LF2 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm



DN1	s1	l1	d41	k1	D1	DN2	s2	l2	d42	k2	D2
½”	3	65	35	60.3	88.9	½”					
¾”	3	75	43	69.8	98.4	¾”					
¾”	3	75	43	69.8	98.4	½”	3	75	35	60.3	88.9
1”	3.5	89	51	79.4	107.9	1”					
1”	3.5	89	51	79.4	107.9	¾”	3	89	43	69.8	98.4
1”	3.5	89	51	79.4	107.9	½”	3	89	35	60.3	88.9
1¼”	3.5	95	64	88.9	117.5	1¼”					
1¼”	3.5	95	64	88.9	117.5	1”	3	95	51	79.4	107.9
1¼”	3.5	95	64	88.9	117.5	¾”	3	95	43	69.8	98.4
1¼”	3.5	95	64	88.9	117.5	½”	3	95	35	60.3	88.9
1½”	3.5	102	73	98.4	127.0	1½”					
1½”	3.5	102	73	98.4	127.0	1¼”	3	102	64	88.9	117.5
1½”	3.5	102	73	98.4	127.0	1”	3	102	51	79.4	107.9
1½”	3.5	102	73	98.4	127.0	¾”	3	102	43	69.8	98.4
1½”	3.5	102	73	98.4	127.0	½”	3	102	35	60.3	88.9

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EQUAL/REDUCING TEES according to ANSI B 16.5 Class 150 - Heavy Duty - Low Temperature

Material specification:
Steel frame: ASTM A 420 Grade WPL 6 according to ANSI B 16.28
Flanges: ASTM A 350-LF2 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
2”	3.5	114	92	120.6	152.4	2”					
2”	3.5	114	92	120.6	152.4	1½”	3	114	73	98.4	127.0
2”	3.5	114	92	120.6	152.4	1¼”	3	114	64	88.9	117.5
2”	3.5	114	92	120.6	152.4	1”	3	114	51	79.4	107.9
2”	3.5	114	92	120.6	152.4	¾”	3	114	43	69.8	98.4
2”	3.5	114	92	120.6	152.4	½”	3	114	35	60.3	88.9
2½”	3.5	127	105	139.7	177.8	2½”					
2½”	3.5	127	105	139.7	177.8	2”	3	127	92	120.6	152.4
2½”	3.5	127	105	139.7	177.8	1½”	3	127	73	98.4	127.0
2½”	3.5	127	105	139.7	177.8	1¼”	3	127	64	88.9	117.5
2½”	3.5	127	105	139.7	177.8	1”	3	127	51	79.4	107.9
2½”	3.5	127	105	139.7	177.8	¾”	3	127	43	69.8	98.4
2½”	3.5	127	105	139.7	177.8	½”	3	127	35	60.3	88.9
3”	4.5	140	127	152.4	190.5	3”					
3”	4.5	140	127	152.4	190.5	2½”	3.5	140	105	139.7	177.8
3”	4.5	140	127	152.4	190.5	2”	3	140	92	120.6	152.4
3”	4.5	140	127	152.4	190.5	1½”	3	140	73	98.4	127.0
3”	4.5	140	127	152.4	190.5	1¼”	3	140	64	88.9	117.5
3”	4.5	140	127	152.4	190.5	1”	3	140	51	79.4	107.9
3”	4.5	140	127	152.4	190.5	¾”	3	140	43	69.8	98.4
3”	4.5	140	127	152.4	190.5	½”	3	140	35	60.3	88.9
4”	7	165	157	190.5	228.6	4”					
4”	7	165	157	190.5	228.6	3”	4	165	127	152.4	190.5
4”	7	165	157	190.5	228.6	2½”	3.5	165	105	139.7	177.8
4”	7	165	157	190.5	228.6	2”	3	165	92	120.6	152.4
4”	7	165	157	190.5	228.6	1½”	3	165	73	98.4	127.0
4”	7	165	157	190.5	228.6	1¼”	3	165	64	88.9	117.5
4”	7	165	157	190.5	228.6	1”	3	165	51	79.4	107.9
4”	7	165	157	190.5	228.6	¾”	3	165	43	69.8	98.4
4”	7	165	157	190.5	228.6	½”	3	165	35	60.3	88.9
5”	7	190	185	215.9	254.0	5”					
5”	7	190	185	215.9	254.0	4”	4.5	190	157	190.5	228.6
5”	7	190	185	215.9	254.0	3”	4	190	127	152.4	190.5
5”	7	190	185	215.9	254.0	2½”	3.5	190	105	139.7	177.8
5”	7	190	185	215.9	254.0	2”	3	190	92	120.6	152.4
5”	7	190	185	215.9	254.0	1½”	3	190	73	98.4	127.0
5”	7	190	185	215.9	254.0	1¼”	3	190	64	88.9	117.5
5”	7	190	185	215.9	254.0	1”	3	190	51	79.4	107.9

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EQUAL/REDUCING TEES according to ANSI B 16.5 class 150 - Heavy Duty - Low Temperature

Material specification: Steel frame: ASTM A 420 Grade WPL 6, according to ANSI B 16.28
Flanges: ASTM A 350-LF2 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894

Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
6”	8	203	216	241.3	279.4	6”					
6”	8	203	216	241.3	279.4	5”	4.5	203	185	215.9	254.0
6”	8	203	216	241.3	279.4	4”	4.5	203	157	190.5	228.6
6”	8	203	216	241.3	279.4	3”	4	203	127	152.4	190.5
6”	8	203	216	241.3	279.4	2½”	3.5	203	105	139.7	177.8
6”	8	203	216	241.3	279.4	2”	3	203	92	120.6	152.4
6”	8	203	216	241.3	279.4	1½”	3	203	73	98.4	127.0
6”	8	203	216	241.3	279.4	1¼”	3	203	64	88.9	117.5
6”	8	203	216	241.3	279.4	1”	3	203	51	79.4	107.9
8”	9.5	229	270	298.4	342.9	8”					
8”	9.5	229	270	298.4	342.9	6”	5	229	216	241.3	279.4
8”	9.5	229	270	298.4	342.9	5”	4.5	229	185	215.9	254.0
8”	9.5	229	270	298.4	342.9	4”	4.5	229	157	190.5	228.6
8”	9.5	229	270	298.4	342.9	3”	4	229	127	152.4	190.5
8”	9.5	229	270	298.4	342.9	2½”	3.5	229	105	139.7	177.8
8”	9.5	229	270	298.4	342.9	2”	3	229	92	120.6	152.4
10”	11	279	324	361.9	406.4	10”					
10”	11	279	324	361.9	406.4	8”	6	279	270	298.4	342.9
10”	11	279	324	361.9	406.4	6”	5	279	216	241.3	279.4
10”	11	279	324	361.9	406.4	5”	4.5	279	185	215.9	254.0
10”	11	279	324	361.9	406.4	4”	4.5	279	157	190.5	228.6
10”	11	279	324	361.9	406.4	3”	4	279	127	152.4	190.5
10”	11	279	324	361.9	406.4	2½”	3.5	279	105	139.7	177.8
10”	11	279	324	361.9	406.4	2”	3	279	92	120.6	152.4
12”	11	305	381	431.8	482.6	12”					
12”	11	305	381	431.8	482.6	10”	7	305	324	361.9	406.4
12”	11	305	381	431.8	482.6	8”	6	305	270	298.4	342.9
12”	11	305	381	431.8	482.6	6”	5	305	216	241.3	279.4
12”	11	305	381	431.8	482.6	5”	4.5	305	185	215.9	254.0
12”	11	305	381	431.8	482.6	4”	4.5	305	157	190.5	228.6
12”	11	305	381	431.8	482.6	3”	4	305	127	152.4	190.5
12”	11	305	381	431.8	482.6	2½”	3.5	305	105	139.7	177.8
12”	11	305	381	431.8	482.6	2”	3	305	92	120.6	152.4

Upon demand “Heavy Duty” lining for vacuum services
Steel frames according to Schedule 40
Vent holes upon operator’s request

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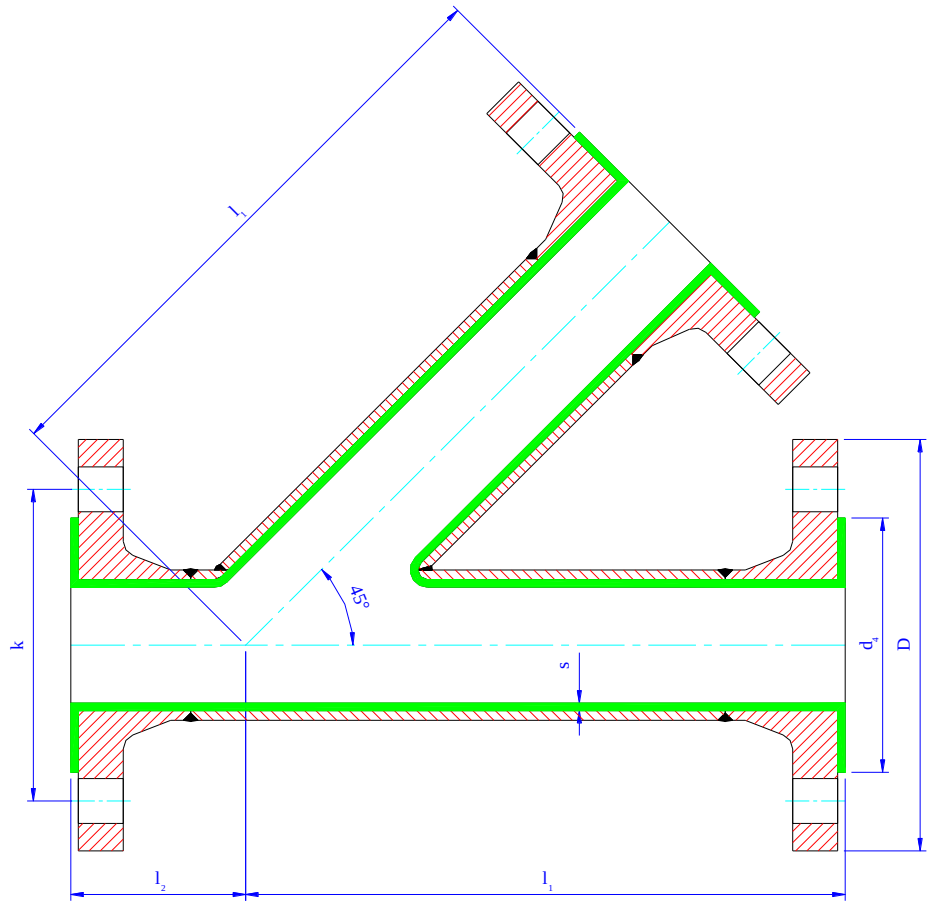
45° LATERAL TEE according to ANSI B 16.5 Class 150

Material specification:

Steel frame:	A 106 Grade B, API 5L Grade B according to ANSI B 36.10
Flanges:	ASTM A 105 according to ANSI B 16.5
Lining:	Virgin PTFE according to ASTM-D 4894
Delivery terms:	according to DIN 2874

Dimensions expressed in mm



DN	s	l_1	l_2	d_4	k	D
1“	3	180	40	51	79.4	107.9
1¼“	3	210	45	64	88.9	117.5
1½“	3	220	50	73	98.4	127.0
2“	3	240	55	92	120.6	152.4
2½“	3.5	260	60	105	139.7	177.8
3“	4	290	70	127	152.4	190.5
4“	4.5	320	80	157	190.5	228.6
5“	4.5	350	90	185	215.9	254.0
6“	5	380	100	216	241.3	279.4
8“	6	455	120	270	298.4	342.9

Steel frames according to Schedule 40
Upon demand “Heavy Duty” lining for vacuum services
Reduced lateral tees and/or lateral tees with different branch angles available on request
Vent holes upon operator’s request

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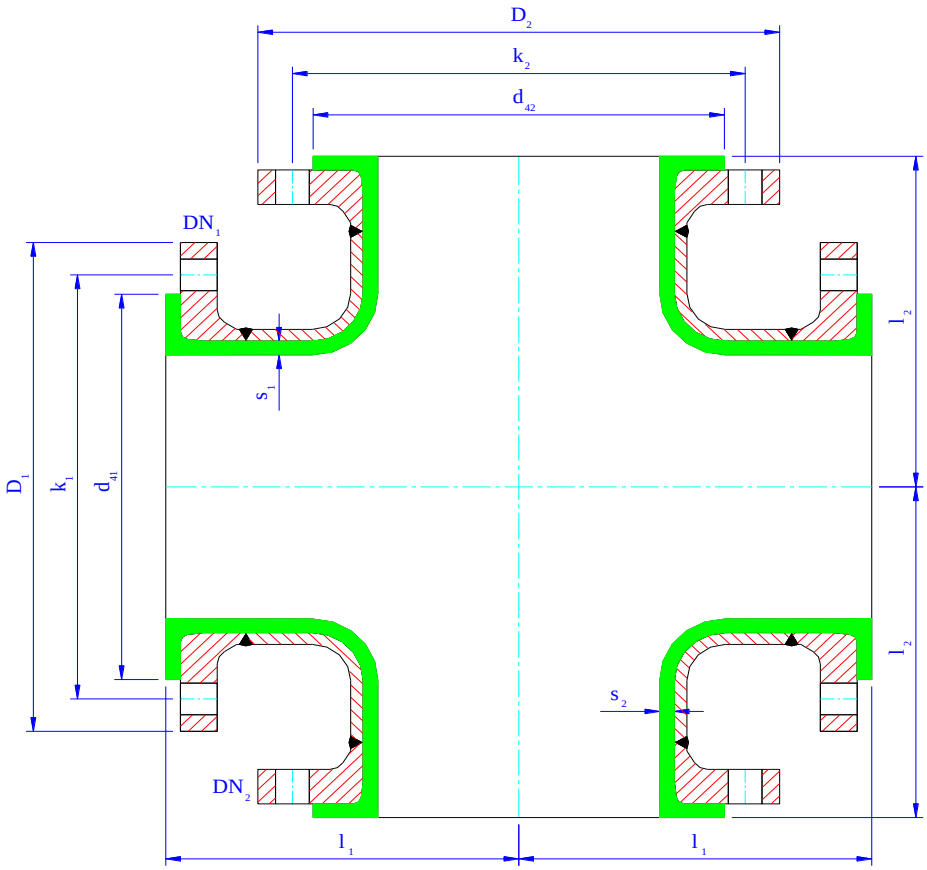
EQUAL AND REDUCING CROSSES according to ANSI B 16.5 Class 150

Material specification:	Steel frame:	ASTM A 234 grade WPB according to ANSI B 16.28
	Flanges:	ASTM A 105 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
	Delivery terms:	according to DIN 2874

Dimensions expressed in mm



DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
½”	3	65	35	60.3	88.9	½”	3	65	35	60.3	88.9
¾”	3	75	43	69.8	98.4	¾”	3	75	43	69.8	98.4
¾”	3	75	43	69.8	98.4	½”	3	75	35	60.3	88.9
1”	3	89	51	79.4	107.9	1”	3	89	51	79.4	107.9
1”	3	89	51	79.4	107.9	¾”	3	89	43	69.8	98.4
1”	3	89	51	79.4	107.9	½”	3	89	35	60.3	88.9
1¼”	3	95	64	88.9	117.5	1¼”	3	95	64	88.9	117.5
1¼”	3	95	64	88.9	117.5	1”	3	95	51	79.4	107.9
1¼”	3	95	64	88.9	117.5	¾”	3	95	43	69.8	98.4
1¼”	3	95	64	88.9	117.5	½”	3	95	35	60.3	88.9
1½”	3	102	73	98.4	127.0	1½”	3	102	73	98.4	127.0
1½”	3	102	73	98.4	127.0	1¼”	3	102	64	88.9	117.5
1½”	3	102	73	98.4	127.0	1”	3	102	51	79.4	107.9
1½”	3	102	73	98.4	127.0	¾”	3	102	43	69.8	98.4
1½”	3	102	73	98.4	127.0	½”	3	102	35	60.3	88.9

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EQUAL AND REDUCING CROSSES according to ANSI B 16.5 Class 150

Material specification:
Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894
Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
2”	3	114	92	120.6	152.4	2”	3	114	92	120.6	152.4
2”	3	114	92	120.6	152.4	1½”	3	114	73	98.4	127.0
2”	3	114	92	120.6	152.4	1¼”	3	114	64	88.9	117.5
2”	3	114	92	120.6	152.4	1”	3	114	51	79.4	107.9
2”	3	114	92	120.6	152.4	¾”	3	114	43	69.8	98.4
2”	3	114	92	120.6	152.4	½”	3	114	35	60.3	88.9
2½”	3.5	127	105	139.7	177.8	2½”	3,5	127	105	139.7	177.8
2½”	3.5	127	105	139.7	177.8	2”	3	127	92	120.6	152.4
2½”	3.5	127	105	139.7	177.8	1½”	3	127	73	98.4	127.0
2½”	3.5	127	105	139.7	177.8	1¼”	3	127	64	88.9	117.5
2½”	3.5	127	105	139.7	177.8	1”	3	127	51	79.4	107.9
2½”	3.5	127	105	139.7	177.8	¾”	3	127	43	69.8	98.4
2½”	3.5	127	105	139.7	177.8	½”	3	127	35	60.3	88.9
3”	4	140	127	152.4	190.5	3”	4	140	127	152.4	190.5
3”	4	140	127	152.4	190.5	2½”	3.5	140	105	139.7	177.8
3”	4	140	127	152.4	190.5	2”	3	140	92	120.6	152.4
3”	4	140	127	152.4	190.5	1½”	3	140	73	98.4	127.0
3”	4	140	127	152.4	190.5	1¼”	3	140	64	88.9	117.5
3”	4	140	127	152.4	190.5	1”	3	140	51	79.4	107.9
3”	4	140	127	152.4	190.5	¾”	3	140	43	69.8	98.4
3”	4	140	127	152.4	190.5	½”	3	140	35	60.3	88.9
4”	4.5	165	157	190.5	228.6	4”	4.5	165	157	190.5	228.6
4”	4.5	165	157	190.5	228.6	3”	4	165	127	152.4	190.5
4”	4.5	165	157	190.5	228.6	2½”	3.5	165	105	139.7	177.8
4”	4.5	165	157	190.5	228.6	2”	3	165	92	120.6	152.4
4”	4.5	165	157	190.5	228.6	1½”	3	165	73	98.4	127.0
4”	4.5	165	157	190.5	228.6	1¼”	3	165	64	88.9	117.5
4”	4.5	165	157	190.5	228.6	1”	3	165	51	79.4	107.9
4”	4.5	165	157	190.5	228.6	¾”	3	165	43	69.8	98.4
4”	4.5	165	157	190.5	228.6	½”	3	165	35	60.3	88.9
5”	4.5	190	185	215.9	254.0	5”	4.5	190	185	215.9	254.0
5”	4.5	190	185	215.9	254.0	4”	4.5	190	157	190.5	228.6
5”	4.5	190	185	215.9	254.0	3”	4	190	127	152.4	190.5
5”	4.5	190	185	215.9	254.0	2½”	3.5	190	105	139.7	177.8
5”	4.5	190	185	215.9	254.0	2”	3	190	92	120.6	152.4
5”	4.5	190	185	215.9	254.0	1½”	3	190	73	98.4	127.0
5”	4.5	190	185	215.9	254.0	1¼”	3	190	64	88.9	117.5
5”	4.5	190	185	215.9	254.0	1”	3	190	51	79.4	107.9

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EQUAL AND REDUCING CROSSES according to ANSI B 16.5 Class 150

Material specification:
Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894
Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	l_1	d_{41}	k_1	D_1	DN_2	s_2	l_2	d_{42}	k_2	D_2
6”	5	203	216	241.3	279.4	6”	5	203	216	241.3	279.4
6”	5	203	216	241.3	279.4	5”	4.5	203	185	215.9	254.0
6”	5	203	216	241.3	279.4	4”	4.5	203	157	190.5	228.6
6”	5	203	216	241.3	279.4	3”	4	203	127	152.4	190.5
6”	5	203	216	241.3	279.4	2½”	3.5	203	105	139.7	177.8
6”	5	203	216	241.3	279.4	2”	3	203	92	120.6	152.4
6”	5	203	216	241.3	279.4	1½”	3	203	73	98.4	127.0
6”	5	203	216	241.3	279.4	1¼”	3	203	64	88.9	117.5
6”	5	203	216	241.3	279.4	1”	3	203	51	79.4	107.9
8”	6	229	270	298.4	342.9	8”	6	229	270	298.4	342.9
8”	6	229	270	298.4	342.9	6”	5	229	216	241.3	279.4
8”	6	229	270	298.4	342.9	5”	4.5	229	185	215.9	254.0
8”	6	229	270	298.4	342.9	4”	4.5	229	157	190.5	228.6
8”	6	229	270	298.4	342.9	3”	4	229	127	152.4	190.5
8”	6	229	270	298.4	342.9	2½”	3.5	229	105	139.7	177.8
8”	6	229	270	298.4	342.9	2”	3	229	92	120.6	152.4
10”	7	279	324	361.9	406.4	10”	7	279	324	361.9	406.4
10”	7	279	324	361.9	406.4	8”	6	279	270	298.4	342.9
10”	7	279	324	361.9	406.4	6”	5	279	216	241.3	279.4
10”	7	279	324	361.9	406.4	5”	4.5	279	185	215.9	254.0
10”	7	279	324	361.9	406.4	4”	4.5	279	157	190.5	228.6
10”	7	279	324	361.9	406.4	3”	4	279	127	152.4	190.5
10”	7	279	324	361.9	406.4	2½”	3.5	279	105	139.7	177.8
10”	7	279	324	361.9	406.4	2”	3	279	92	120.6	152.4
12”	7	305	381	431.8	482.6	12”	7	305	381	431.8	482.6
12”	7	305	381	431.8	482.6	10”	7	305	324	361.9	406.4
12”	7	305	381	431.8	482.6	8”	6	305	270	298.4	342.9
12”	7	305	381	431.8	482.6	6”	5	305	216	241.3	279.4
12”	7	305	381	431.8	482.6	5”	4.5	305	185	215.9	254.0
12”	7	305	381	431.8	482.6	4”	4.5	305	157	190.5	228.6
12”	7	305	381	431.8	482.6	3”	4	305	127	152.4	190.5
12”	7	305	381	431.8	482.6	2½”	3.5	305	105	139.7	177.8
12”	7	305	381	431.8	482.6	2”	3	305	92	120.6	152.4

Upon demand “Heavy Duty” lining for vacuum services
Steel frames according to Schedule 40
Vent holes upon operator’s request

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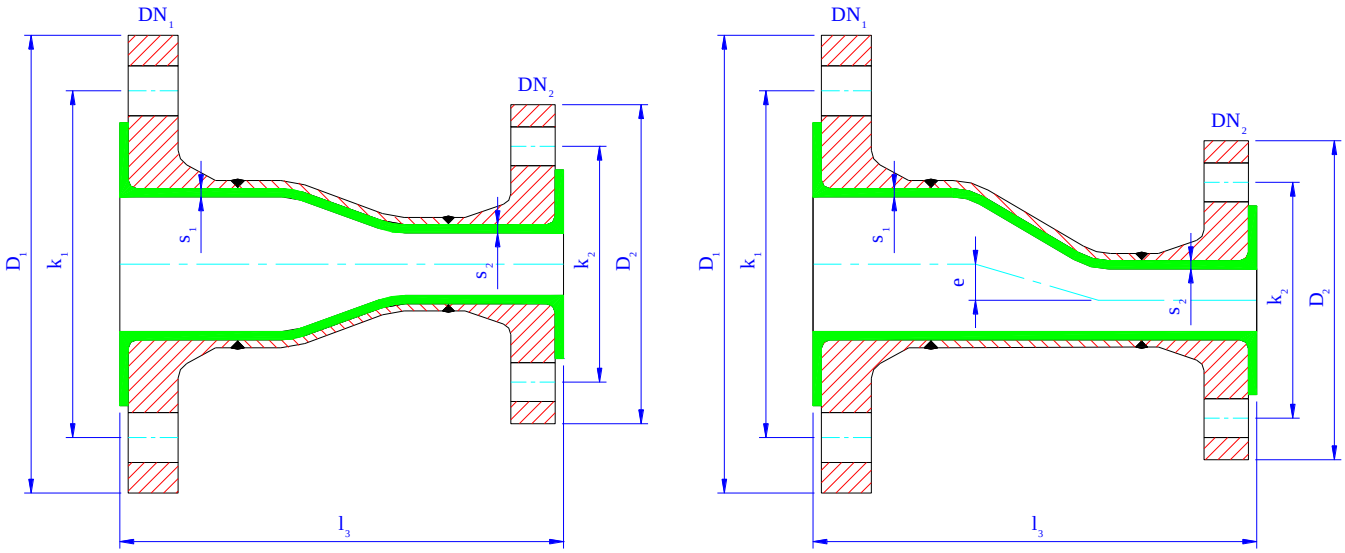
FLANGED REDUCERS according to ANSI B 16.5 Class 150

CONCENTRIC / ECCENTRIC

Material specification:	Steel frame:	ASTM A 234 Grade WPB according to ANSI B 16.28
	Flanges:	ASTM A 105 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
	Delivery terms:	according to DIN 2874

Dimensions expressed in mm



DN_1	s_1	DN_2	s_2	e	l_3	k_1	D_1	k_2	D_2
¾“	3	½ “	3	3	114	69.8	98.4	60.3	88.9
1“	3	¾“	3	3	114	79.4	107.9	69.8	98.4
1“	3	½“	3	3	114	79.4	107.9	60.3	88.9
1¼“	3	1“	3	4	114	88.9	117.5	79.4	107.9
1¼“	3	¾“	3	4	114	88.9	117.5	69.8	98.4
1¼“	3	½“	3	4	114	88.9	117.5	60.3	88.9
1½“	3	1¼“	3	3	114	98.4	127.0	88.9	117.5
1½“	3	1“	3	7	114	98.4	127.0	79.4	107.9
1½“	3	¾“	3	7	114	98.4	127.0	69.8	98.4
1½“	3	1“	3	7	114	98.4	127.0	79.4	107.9
1½“	3	½“	3	7	114	98.4	127.0	60.3	88.9
2“	3	1½“	3	6	127	120.6	152.4	98.4	127.0
2“	3	1¼“	3	9	127	120.6	152.4	88.9	117.5
2“	3	1“	3	13	127	120.6	152.4	79.4	107.9
2“	3	¾“	3	13	127	120.6	152.4	69.8	98.4
2“	3	½“	3	13	127	120.6	152.4	60.3	88.9
2½“	3.5	2“	3	8	140	139.7	177.8	120.6	152.4
2½“	3.5	1½“	3	14	140	139.7	177.8	98.4	127.0
2½ “	3.5	1¼“	3	17	140	139.7	177.8	88.9	117.5
2½“	3.5	1“	3	21	140	139.7	177.8	79.4	107.9
2½“	3.5	¾“	3	21	140	139.7	177.8	69.8	98.4
2½“	3.5	½“	3	21	140	139.7	177.8	60.3	88.9

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FLANGED REDUCERS according to ANSI B 16.5 Class 150

CONCENTRIC / ECCENTRIC

Material specification:
Steel frame: ASTM A 234 Grade WPB according to ANSI B 16.28
Flanges: ASTM A 105 according to ANSI B 16.5
Lining: Virgin PTFE according to ASTM-D 4894
Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	s_1	DN_2	s_2	e	l_3	k_1	D_1	k_2	D_2
3“	4	2½“	3.5	6	152	152.4	190.5	139.7	177.8
3“	4	2“	3	14	152	152.4	190.5	120.6	152.4
3“	4	1½“	3	20	152	152.4	190.5	98.4	127.0
3“	4	1¼“	3	23	152	152.4	190.5	88.9	117.5
3“	4	1“	3	28	152	152.4	190.5	79.4	107.9
3“	4	¾“	3	28	152	152.4	190.5	69.8	98.4
3“	4	½“	3	28	152	152.4	190.5	60.3	88.9
4“	4.5	3“	4	13	178	190.5	228.6	152.4	190.5
4“	4.5	2½“	3.5	19	178	190.5	228.6	139.7	177.8
4“	4.5	2“	3	27	178	190.5	228.6	120.6	152.4
4“	4.5	1½“	3	33	178	190.5	228.6	98.4	127.0
4“	4.5	1¼“	3	36	178	190.5	228.6	88.9	117.5
4“	4.5	1“	3	40	178	190.5	228.6	79.4	107.9
4“	4.5	¾“	3	40	178	190.5	228.6	69.8	98.4
4“	4.5	½“	3	40	178	190.5	228.6	60.3	88.9
5“	4.5	4“	4.5	13	203	215.9	254.0	190.5	228.6
5“	4.5	3“	4	25	203	215.9	254.0	152.4	190.5
5“	4.5	2½“	3.5	32	203	215.9	254.0	139.7	177.8
5“	4.5	2“	3	40	203	215.9	254.0	120.6	152.4
6“	5	5“	4,5	14	229	241.3	279.4	215.9	254.0
6“	5	4“	4,5	27	229	241.3	279.4	190.5	228.6
6“	5	3“	4	40	229	241.3	279.4	152.4	190.5
6“	5	2½“	3.5	46	229	241.3	279.4	139.7	177.8
6“	5	2“	3	54	229	241.3	279.4	120.6	152.4
8“	6	6“	5	25	279	298.4	342.9	241.3	279.4
8“	6	5“	4.5	40	279	298.4	342.9	215.9	254.0
8“	6	4“	4.5	52	279	298.4	342.9	190.5	228.6
10“	7	8“	6	27	305	361.9	406.4	298.4	342.9
10“	7	6“	5	52	305	361.9	406.4	241.3	279.4
10“	7	5“	4.5	67	305	361.9	406.4	215.9	254.0
10“	7	4“	4.5	79	305	361.9	406.4	190.5	228.6
12“	7	10“	7	25	356	431.8	482.6	361.9	406.4
12“	7	8“	6	52	356	431.8	482.6	298.4	342.9
12“	7	6“	5	78	356	431.8	482.6	241.3	279.4

Upon demand “Heavy Duty” lining for vacuum services
Steel frames according to Schedule 40
Vent holes upon operator’s request

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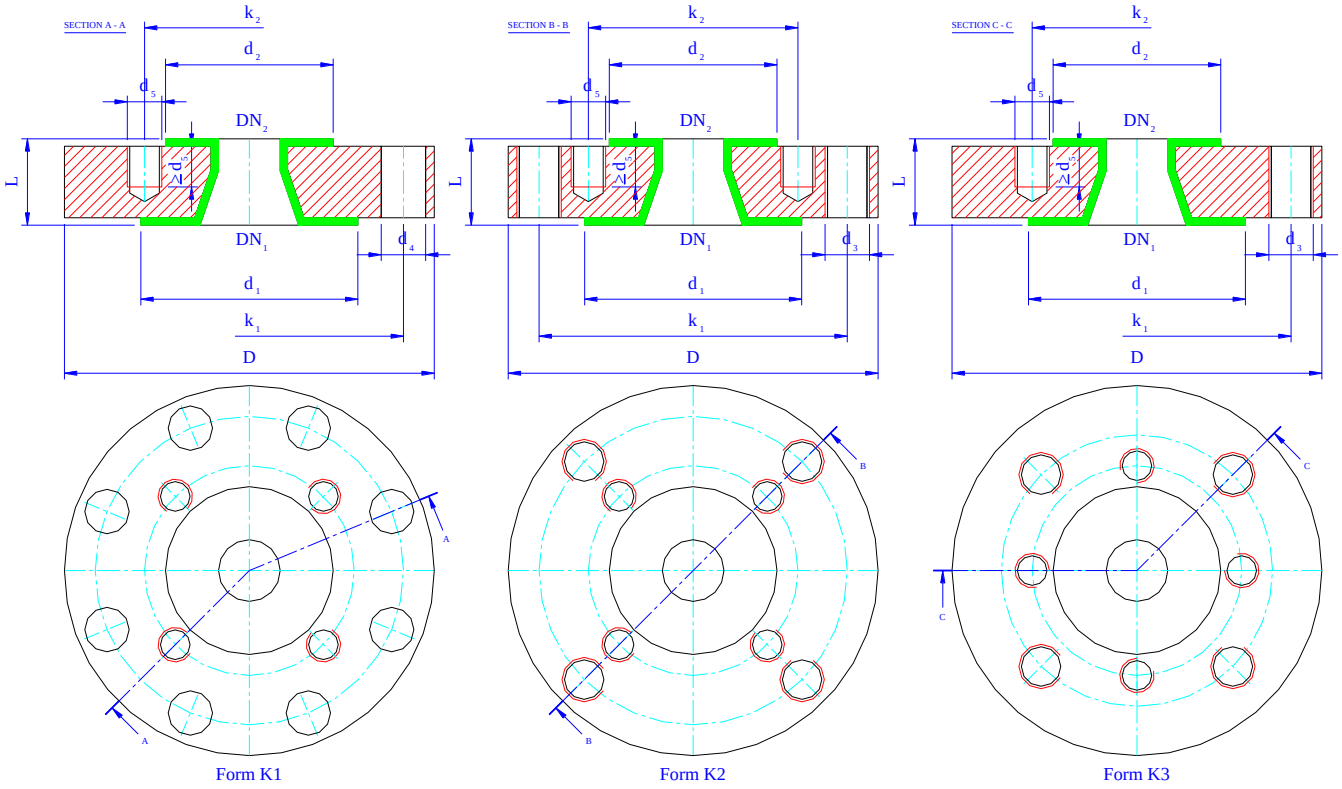
CONCENTRIC REDUCING FLANGE according to ANSI B 16.5 Class 150

Material specification:
Steel frame: St 44.2 according to DIN 17100
Lining: Virgin PTFE according to ASTM-D 4894
Delivery terms: according to DIN 2874

Dimensions expressed in mm



Form K1 Form K2 Form K3

DN_1	DN_2	Type	D	d_1	k_1	n x d_3	n x d_4	d_2	k_2	n x d_5	l
¾“	½“	K3	98.4	43	69.7	4 x ½“		35	60.3	4 x ½“	38.1
1“	¾“	K3	107.9	51	79.4	4 x ½“		43	69.8	4 x ½“	38.1
1“	½“	K3	107.9	51	79.4	4 x ½“		35	60.3	4 x ½“	38.1
1¼“	1“	K3	117.5	64	88.9	4 x ½“		51	79.4	4 x ½“	38.1
1¼“	¾“	K3	117.5	64	88.9	4 x ½“		43	69.8	4 x ½“	38.1
1¼“	½“	K3	117.5	64	88.9	4 x ½“		35	60.3	4 x ½“	38.1
1½“	1¼“	K3	127.0	73	98.4	4 x ½“		64	88.9	4 x ½“	38.1
1½“	1“	K3	127.0	73	98.4	4 x ½“		51	79.4	4 x ½“	38.1
1½“	¾“	K2	127.0	73	98.4	4 x ½“		43	69.8	4 x ½“	38.1
1½“	½“	K2	127.0	73	98.4	4 x ½“		35	60.3	4 x ½“	38.1
2“	1½“	K3	152.4	92	120.6	4 x ⅝ “		73	98.4	1 x ½“	38.1
2“	1¼“	K3	152.4	92	120.6	4 x ⅝ “		64	88.9	4 x ½“	38.1
2“	1“	K2	152.4	92	120.6	4 x ⅝ “		51	79.4	4 x ½“	38.1
2“	¾“	K2	152.4	92	120.6	4 x ⅝ “		43	69.8	4 x ½“	38.1
2“	½“	K2	152.4	92	120.6	4 x ⅝ “		35	60.3	4 x ½“	38.1

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CONCENTRIC REDUCING FLANGE according to ANSI B 16.5 Class 150

Material specification:
Steel frame: St 44.2 according to DIN 17100
Lining: Virgin PTFE according to ASTM-D 4894
Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	DN_2	Type	D	d_1	k_1	n x d_3	n x d_4	d_2	k_2	n x d_5	l
2½“	2“	K3	177.8	105	139.7	4 x ⅝“		92	120.6	4 x ⅝“	38.1
2½“	1½“	K3	177.8	105	139.7	4 x ⅝“		73	98.4	1 x ½“	38.1
2½“	1¼“	K2	177.8	105	139.7	4 x ⅝“		64	88.9	4 x ½“	38.1
2½“	1“	K2	177.8	105	139.7	4 x ⅝“		51	79.4	4 x ½“	38.1
2½“	¾“	K2	177.8	105	139.7	4 x ⅝“		43	69.8	4 x ½“	38.1
2½“	½“	K2	177.8	105	139.7	4 x ⅝“		35	60.3	4 x ½“	38.1
3“	2½“	K2	190.5	127	152.4	4 x ⅝“		105	139.7	4 x ⅝“	38.1
3“	2“	K2	190.5	127	152.4	4 x ⅝“		92	120.6	4 x ⅝“	38.1
3“	1½“	K2	190.5	127	152.4	4 x ⅝“		73	98.4	1 x ½“	38.1
3“	1¼“	K2	190.5	127	152.4	4 x ⅝“		64	88.9	4 x ½“	38.1
3“	1“	K1	190.5	127	152.4		4 x 19	51	79.4	4 x ½“	38.1
3“	¾“	K1	190.5	127	152.4		4 x 19	43	69.8	4 x ½“	38.1
3“	½“	K1	190.5	127	152.4		4 X 19	35	60.3	4 x ½“	38.1
4“	3“	K3	228.6	157	190.5	8 x ⅝“		127	152.4	4 x ⅝“	38.1
4“	2½“	K2	228.6	157	190.5	8 x ⅝“		105	139.7	4 x ⅝“	38.1
4“	2“	K2	228.6	157	190.5	8 x ⅝ “		92	120.6	4 x ⅝“	38.1
4“	1½“	K1	228.6	157	190.5		8 x 19	73	98.4	1 x ½“	50.8
4“	1¼“	K1	228.6	157	190.5		8 x 19	64	88.9	4 x ½“	50.8
4“	1“	K1	228.6	157	190.5		8 x 19	51	79.4	4 x ½“	50.8
4“	¾“	K1	228.6	157	190.5		8 x 19	43	69.8	4 x ½“	50.8
4“	½“	K1	228.6	157	190.5		8 x 19	35	60.3	4 x ½“	50.8
5“	4“	K3	254.0	185	215.9	8 x ¾“		157	190.5	8 x ⅝“	38.1
5“	3“	K2	254.0	185	215.9	8 x ¾“		127	152.4	4 x ⅝“	38.1
5“	2½“	K2	254.0	185	215.9	8 x ¾“		105	139.7	4 x ⅝“	50.8
5“	2“	K1	254.0	185	215.9		8 x 22	92	120.6	4 x ⅝“	50.8
5“	1½“	K1	254.0	185	215.9		8 x 22	73	98.4	1 x ½“	50.8
5“	1¼“	K1	254.0	185	215.9		8 x 22	64	88.9	4 x ½“	50.8
5“	1“	K1	254.0	185	215.9		8 x 22	51	79.4	4 x ½“	50.8
5“	¾“	K1	254.0	185	215.9		8 x 22	43	69.8	4 x ½“	50.8
5“	½“	K1	254.0	185	215.9		8 x 22	35	60.3	4 x ½“	50.8
6“	5“	K3	279.4	216	241.3	8 x ¾“		185	215.9	8 x ¾“	38.1
6“	4“	K2	279.4	216	241.3	8 x ¾“		157	190.5	8 x ⅝“	38.1
6“	3“	K1	279.4	216	241.3		8 x 22	127	152.4	4 x ⅝“	50.8
6“	2½“	K1	279.4	216	241.3		8 x 22	105	139.7	4 x ⅝“	50.8
6“	2“	K1	279.4	216	241.3		8 x 22	92	120.6	4 x ⅝ “	50.8
6“	1½“	K1	279.4	216	241.3		8 x 22	73	98.4	1 x ½“	50.8
6“	1¼“	K1	279.4	216	241.3		8 x 22	64	88.9	4 x ½“	50.8
6“	1“	K1	279.4	216	241.3		8 x 22	51	79.4	4 x ½“	50.8
6“	¾“	K1	279.4	216	241.3		8 x 22	43	69.8	4 x ½“	50.8
6“	½“	K1	279.4	216	241.3		8 x 22	35	60.3	4 x ½“	50.8

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CONCENTRIC REDUCING FLANGE according to ANSI B 16.5 Class 150

Material specification:
Steel frame: St 44.2 according to DIN 17100
Lining: Virgin PTFE according to ASTM-D 4894
Delivery terms: according to DIN 2874

Dimensions expressed in mm

DN_1	DN_2	Type	D	d_1	k_1	n x d_3	n x d_4	d_2	k_2	n x d_5	l
8“	6“	K2	342.9	270	298.4	8 x ¾“		216	241.3	8 x ¾“	38.1
8“	5“	K1	342.9	270	298.4		8 x 22	185	215.9	8 x ¾“	38.1
8“	4“	K1	342.9	270	298.4		8 x 22	157	190.5	8 x ⅝“	50.8
8“	3“	K1	342.9	270	298.4		8 x 22	127	152.4	4 x ⅝“	50.8
8“	2½“	K1	342.9	270	298.4		8 x 22	105	139.7	4 x ⅝“	50.8
8“	2“	K1	342.9	270	298.4		8 x 22	92	120.6	4 x ⅝“	50.8
8“	1½“	K1	342.9	270	298.4		8 x 22	73	98.4	1 x ½“	50.8
8“	1¼“	K1	342.9	270	298.4		8 x 22	64	88.9	4 x ½“	50.8
8“	1“	K1	342.9	270	298.4		8 x 22	51	79.4	4 x ½“	50.8
8“	¾“	K1	342.9	270	298.4		8 x 22	43	69.8	4 x ½“	50.8
8“	½“	K1	342.9	270	298.4		8 x 22	35	60.3	4 x ½“	50.8
10“	8“	K2	406.4	324	361.9	12 x ⅞“		270	298.4	8 x ¾“	38.1
10“	6“	K1	406.4	324	361.9		12 x 25	216	241.3	8 x ¾“	50.8
10“	5“	K1	406.4	324	361.9		12 x 25	185	215.9	8 x ¾“	50.8
10“	4“	K1	406.4	324	361.9		12 x 25	157	190.5	8 x ⅝“	50.8
10“	3“	K1	406.4	324	361.9		12 x 25	127	152.4	4 x ⅝“	50.8
10“	2½“	K1	406.4	324	361.9		12 x 25	105	139.7	4 x ⅝“	50.8
10“	2“	K1	406.4	324	361.9		12 x 25	92	120.6	4 x ⅝“	50.8
10“	1½“	K1	406.4	324	361.9		12 x 25	73	98.4	1 x ½“	50.8
10“	1¼“	K1	406.4	324	361.9		12 x 25	64	88.9	4 x ½“	50.8
10“	1“	K1	406.4	324	361.9		12 x 25	51	79.4	4 x ½“	50.8
10“	¾“	K1	406.4	324	361.9		12 x 25	43	69.8	4 x ½“	50.8
10“	½“	K1	406.4	324	361.9		12 x 25	35	60.3	4 x ½“	50.8
12“	10“	K2	482.6	381	431.8	12 x ⅞“		324	36.9	4 x ⅝“	38.1
12“	8“	K1	482.6	381	431.8		12 x 25	270	298.4	8 x ¾“	50.8
12“	6“	K1	482.6	381	431.8		12 x 25	216	241.3	8 x ¾“	50.8
12“	5“	K1	482.6	381	431.8		12 x 25	185	215.9	8 x ¾“	50.8
12“	4“	K1	482.6	381	431.8		12 x 25	157	190.5	8 x ⅝“	50.8
12“	3“	K1	482.6	381	431.8		12 x 25	127	152.4	4 x ⅝“	50.8
12“	2½“	K1	482.6	381	431.8		12 x 25	105	139.7	4 x ⅝“	50.8
12“	2“	K1	482.6	381	431.8		12 x 25	92	120.6	4 x ⅝“	50.8
12“	1½“	K1	482.6	381	431.8		12 x 25	73	98.4	1 x ½“	50.8
12“	1¼“	K1	482.6	381	431.8		12 x 25	64	88.9	4 x ½“	50.8
12“	1“	K1	482.6	381	431.8		12 x 25	51	79.4	4 x ½“	50.8
12“	¾“	K1	482.6	381	431.8		12 x 25	43	69.8	4 x ½“	50.8
12“	½“	K1	482.6	381	431.8		12 x 25	35	60.3	4 x ½“	50.8

Upon request eccentrical reducing flanges

f.e.s.

fluoroplastic engineering service

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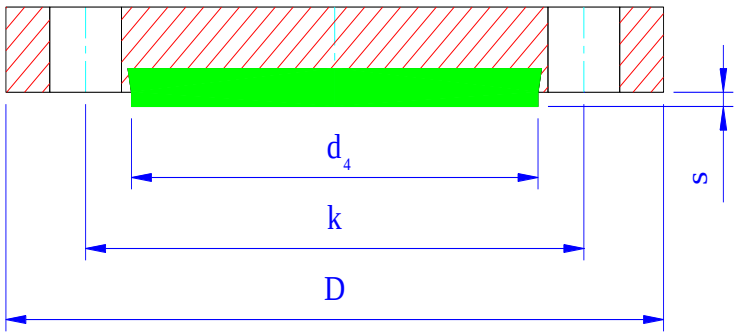
BLANK FLANGE according to ANSI B 16.5 Class 150

Material specification:	Flange:	ASTM A 105 according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
	Delivery terms:	according to DIN 2874

Dimensions expressed in mm



DN	s	d_4	k	D
½“	3	35	60.3	88.9
¾	3	43	69.8	98.4
1“	3	51	79.4	107.9
1¼“	3	64	88.9	117.5
1½“	3	73	98.4	127.0
2“	3	92	120.6	152.4
2½“	3.5	105	139.7	177.8
3“	4	127	152.4	190.5
4“	4.5	157	190.5	228.6
5“	4.5	185	215.9	254.0
6“	5	216	241.3	279.4
8“	6	270	298.4	342.9
10“	7	324	361.9	406.4
12”	7	381	431.8	482.6

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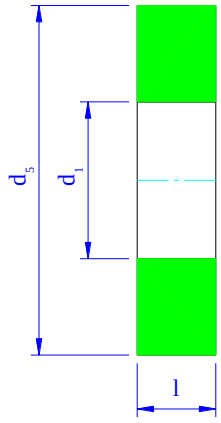
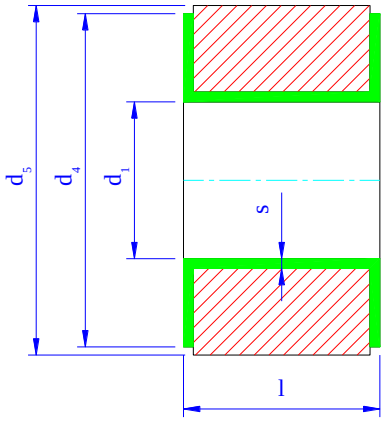
SPACERS and ARMORED SPACERS according to ANSI B 16.5 Class 150

Material specification:	Form F:	Virgin PTFE according to ASTM-D 4894
	Form G + H:	ASTM A 106 Grade B according to ANSI B 36.10
		API 5L Grade B according to ANSI B 36.10
		ASTM A 105 according to ANSI B 36.10
		St 52.0 according to DIN 1629
	Delivery terms:	according to DIN 2874

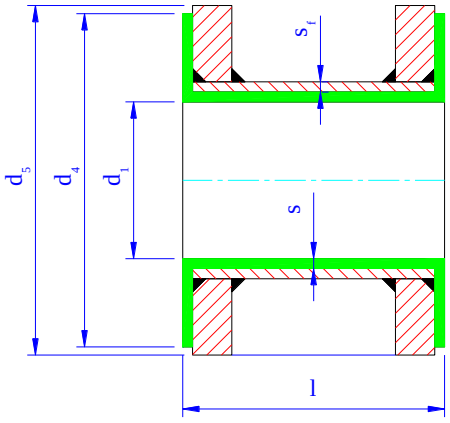
Dimensions expressed in mm



Form F



Form G



Form H

DN	d_1	s_s	s	d_4	d_5	l (Form F)	l (Form G)	l (Form H)
½“	9	3.00	3	35	44			
¾“	15	3.00	3	43	53			
1“	19	3.38	3	51	63			
1¼“	28	3.56	3	64	72			
½“	32	3.68	3	73	82			
2“	44	3.91	3	92	101			
2½“	61	5.16	3.5	105	119	5 - 20	10 - 70	60 - 100
3“	69	5.49	4	127	132			
4“	94	6.02	4.5	157	171			
5“	121	6.55	4.5	186	192			
6“	144	7.11	5	216	218			
8“	194	6.35	6	270	275			
10“	246	6.35	7	324	337			
12”	297	6.35	7	381	406			

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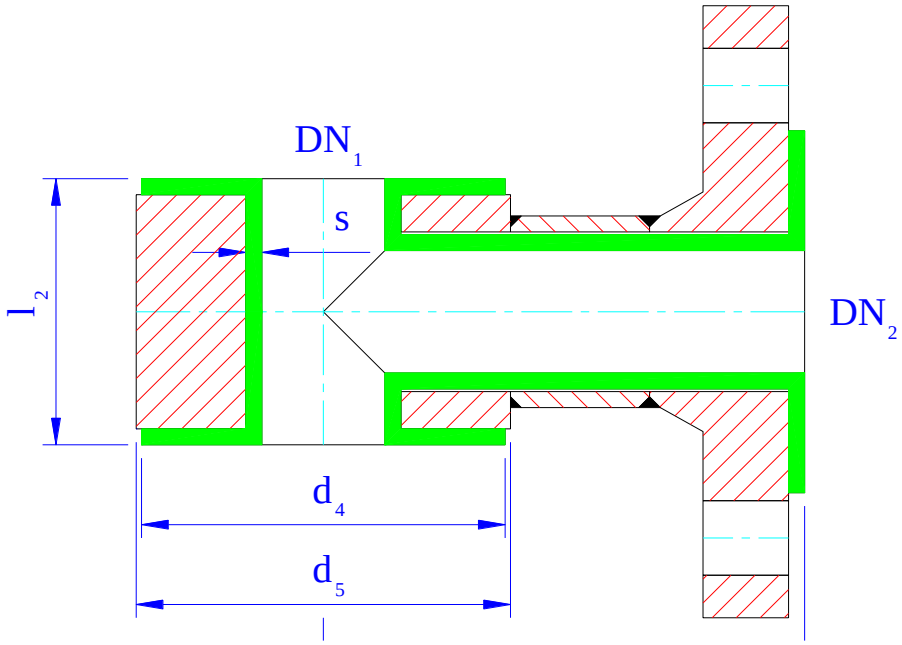
INSTRUMENT TAPPING according to ANSI B 16.5 Class 150

Material specification:	Steel frame:	ASTM A 106 Grade B according to ANSI B 36.10 API 5L Grade B according to ANSI B 36.10 St 52.0 according to DIN 1629
	Flanges:	A 105 Grade B according to ANSI B 16.5
	Lining:	Virgin PTFE according to ASTM-D 4894
	Delivery terms:	according to DIN 2874

Dimensions expressed in mm



Main passage					Branch DN_2		
DN_1	s	d_4	d_5	l_1	1“ l_2	1½“ l_2	2“ l_2
1“	3	51	63	89	51	75	90
1¼“	3	64	72	95	51	75	90
1½“	3	73	82	102	51	75	90
2“	3	92	101	114	51	75	90
2½“	3.5	105	119	127	51	75	90
3“	4	127	132	140	51	75	90
4“	4.5	157	171	165	51	75	90
5“	4.5	186	192	190	51	75	90
6“	5	216	218	203	51	75	90
8“	6	270	275	229	51	75	90
10“	7	324	337	279	51	75	90
12”	7	381	406	305	51	75	90

Upon request further dimensions available
On demand instrument tappings with double, triple and quadruple branches available
Vent holes upon operator’s request

CSI SpA
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20030 Senago - MI - I
Cascina Traversagna 2

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Fax +39 02 3503940

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ACCREDIA

Registrazione numero/*Registration number*	PED/0497/412/05

CERTIFICATO CE DEL TIPO

EC TYPE EXAMINATION CERTIFICATE

si certifica che la Società/*we certify that the Company*

LMP FLUORCARBON S.r.l.

Via Marconi, 127 - 21020 TAINO (VA) - ITALY

ha realizzato il seguente Tipo di Insieme in pressione che soddisfa i Requisiti Essenziali di Sicurezza dell'Allegato I e le procedure del Modulo B, Allegato III, della Direttiva 97/23/CE

has realized the following Type of pressure Assembly that meets the Essential Safety Requirements of Annex I and the procedures of Module B, Annex III, of the 97/23/EC Directive

TUBI DRITTI E CURVI CON DIRAMAZIONI E NON, RIDUZIONI E VISORI IN ACCIAIO AL CARBONIO RIVESTITI IN PTFE

PTFE-LINED PIPES AND SHAPED CARBON STEEL PARTS, REDUCERS AND SIGHT GLASSES

32<=DN<=300: PS_{max} 21 barg; 350<=DN<=600: PS_{max} 10 barg
TS_{min} -10 °C; TS_{max} +200 °C
Gruppo Fluido/*Fluid Group* 1; Categoria/*Category* I - II - III

Il Fabbricante è autorizzato ad apporre sull'Attrezzatura in pressione di cui sopra, dopo la marcatura CE, il numero di identificazione dell'Organismo Notificato.

The Manufacturer is authorized to provide the above pressure Equipment with the CE marking, followed by the Notified Body identification number.

CE 0497

20/05/2005	29/10/2015	19/05/2025
Prima emissione	Ultima emissione	Scadenza
First issue	*Latest issue*	*Expiring*

GRUPPO IMQ

CSI *Ing. R. Gatti*
Amm. Delegato/Managing Director

CSI SpA
Sede Legale
20030 Senago - MI - I
Cascina Traversagna 21

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ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

SGQ N° 032A
SGA N° 032D
PRD N° 032B
ISP N° 049E
LAB N° 0006

Membro degli accordi di Mutuo Riconoscimento EA, IAF e ILAC

Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Registrazione numero/*Registration number*	PED/0497/413/05

CERTIFICATO CE DEL TIPO

EC TYPE EXAMINATION CERTIFICATE

si certifica che la Società/*we certify that the Company*

LMP FLUORCARBON S.r.l.

Via Marconi, 127 - 21020 TAINO (VA) - ITALY

ha implementato e mantiene la conformità al Tipo - Certificato CE n° PED/0497/412/05 - ai Requisiti Essenziali di Sicurezza dell'Allegato I e alle Procedure del Modulo C1 - Allegato III della Direttiva 97/23/CE

has implemented and maintains the compliance with the Type, Certificate CE nb. PED/0497/412/05 - with the Essential Safety Requirements of Annexe I and with the Procedure of Module C1 - Annexe III of the 97/23/EC Directive

allo scopo di produrre e collaudare

for manufacturing and testing

TUBI DRITTI E CURVI CON DIRAMAZIONI E NON, RIDUZIONI E VISORI RIVESTITI IN PTFE

PTFE-LINED PIPES AND SHAPED PARTS, REDUCERS AND SIGHT GLASSES

$32 \leq DN \leq 150$: PS_{max} 16 barg; $150 < DN \leq 600$: PS_{max} 10 barg

Gruppo Fluido/*Fluid Group* 1 - Categoria/*Category* I - II - III

Il Fabbricante è autorizzato ad apporre sull'Attrezzatura in pressione di cui sopra, dopo la marcatura CE, il numero di identificazione dell'Organismo Notificato.

The Manufacturer is authorized to provide the above pressure Equipment with the CE marking, followed by the Notified Body identification number.

CE 0497

20/05/2005	30/04/2014	19/05/2017
Prima emissione *First issue*	Ultima emissione *Latest issue*	Scadenza *Expiring*

GRUPPO IMQ

Ing. P. Cau
AMM. DELEGATO / CEO