

DucoVer®

Fiberglass Piping

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Versteden®
fiberglass piping systems

FIBERGLASS PIPING

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FIBERGLASS PIPING

DucoVer Fiberglass piping (FRP) are manufactured from Polyester (GRUP), Vinyl ester (GRVE) or Epoxy (GRE) resin in combination with glass fiber, in accordance with ISO 14692 standard.

DucoVer Fiberglass pipes are available in the diameters 25 till 2.000 mm in PN 10 and up till 1.000 mm in PN 16.

PIPE WALL STRUCTURE

Liner

The inner liner provides chemical resistance properties and acts as an anti-diffusion barrier. This resin-rich layer is manufactured with "C" glass veil and "E" glass mat and has a standard nominal thickness of 1 mm.

On request the liner thickness can be delivered as 2,5 or 5 mm.

Structural wall

The structural wall of the pipe is to withstand the mechanical forces. Reinforcement materials consists of "E" glass roving with a number of layers in function depending on the diameter and pressure class.

The pipes are manufactured with a computer controlled machine by the "dual helical filament winding" process, in which the rovings, impregnated with resin, are wound around a steel core at an angle of 55° until the required thickness is reached.

External layer

The UV-resistant outer layer consists of low weight synthetic veil and is in relatively rich of naturel resin with a thickness of 0.2 mm. On request, the pipes can be supplied in any possible RAL colour.

CONNECTION SYSTEMS

The connection systems which can be used are:

- Laminate connection
- Flange connection
- Bell & spigot Key-lock Coupling connection

Laminated connection

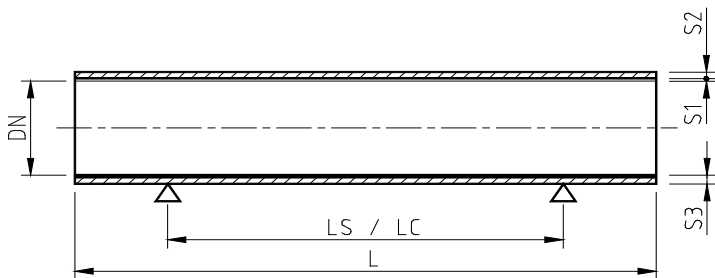
For laminated connection, plain end pipes and/or fittings are assembled by applying glass (mat/woven) and the same resin as is used for the pipes, flanges and fittings.

Flange connection

Flanges are delivered as collar with lapped flange or on request as fixed flange. The flanges are drilled according to ANSI or DIN standards. Other standards are available on request.

Bell & spigot Key-lock Coupling connection

Bell and spigots are monolithic integrated to the pipe during the production process. The seal of this coupling is guaranteed by two rubber O-rings which are mounted into the spigot grooves. The coupling is secured in axial direction, by means of a nylon rod which is tangentially mounted through an opening in the bell. The coupling will be tested by means of a brass test nipple which is mounted on the Bell and positioned between the two EPDM O-rings.



PN 10													
LIQUIDS $\rho_{med} = 1$													
DN (mm)	1,00 x PN			0,75 x PN			0,5 x PN			(Working)	L (mm)	DN (inch)	
	S2 (mm)	S3 (mm)	pd = 10,00 bar(g)	pd = 7,50 bar(g)	pd = 5,00 bar(g)	pd = 10,00 bar(g)	pd = 7,50 bar(g)	pd = 5,00 bar(g)					
			Ls (mm)	Lc (mm)	Rb (m)	Ls (mm)	Lc (mm)	Rb (m)	Ls (mm)	Lc (mm)	Rb (m)		
300	3,0	4,2	3.980	5.180	236	3.980	5.960	154	3.980	5.960	114	12.000	12"
350	3,0	4,2	3.420	4.200	422	4.140	5.880	216	4.140	6.200	145	12.000	14"
400	3,8	5,0	4.400	5.400	363	4.540	6.780	219	4.540	6.780	157	12.000	16"
450	3,8	5,0	3.640	4.460	603	4.680	6.440	288	4.680	7.000	189	12.000	18"
500	4,6	5,8	4.580	5.600	507	5.020	7.460	287	5.020	7.500	200	12.000	20"
600	5,3	6,5	4.740	5.800	664	5.460	7.920	357	5.460	8.180	244	12.000	24"
700	6,1	7,3	4.900	6.000	831	5.880	8.360	428	5.880	8.780	288	12.000	28"
750	6,1	7,3	4.200	5.140	1.212	5.980	7.920	511	5.980	8.940	324	12.000	30"
800	6,8	8,0	5.040	6.180	1.008	6.260	8.760	500	6.260	9.360	333	12.000	32"
900	7,6	8,8	5.180	6.360	1.192	6.620	9.160	573	6.620	9.900	377	12.000	36"
1000	8,4	9,6	5.320	6.520	1.382	6.960	9.540	646	6.960	10.420	422	12.000	40"
1100	9,1	10,3	5.460	6.680	1.578	7.280	9.900	720	7.280	10.900	466	12.000	44"
1200	9,9	11,1	5.600	6.860	1.778	7.600	10.260	794	7.600	11.360	511	12.000	48"
1300	10,6	11,8	5.720	7.020	1.983	7.900	10.600	868	7.900	11.820	556	12.000	52"
1400	11,4	12,6	5.840	7.160	2.191	8.180	10.920	943	8.180	12.240	601	12.000	56"
1500	12,2	13,4	5.980	7.320	2.402	8.460	11.240	1.018	8.460	12.660	646	12.000	60"
1600	13,7	14,9	7.160	8.780	2.003	8.860	12.440	997	8.860	13.240	664	12.000	64"
1800	15,2	16,4	7.360	9.020	2.369	9.360	13.000	1.143	9.360	14.000	753	12.000	72"
2000	16,7	17,9	7.560	9.260	2.749	9.840	13.520	1.289	9.840	14.740	842	12.000	80"

REMARKS:

Fabrication according to ISO 14692 (Filament-wound)

Plain end for jointing by lamination

DN = inside diameter

S1 = 1 mm (inside liner thickness)

S2 = structural wall thickness

S3 = total wall thickness with 1 mm liner and 0,2 mm topcoat

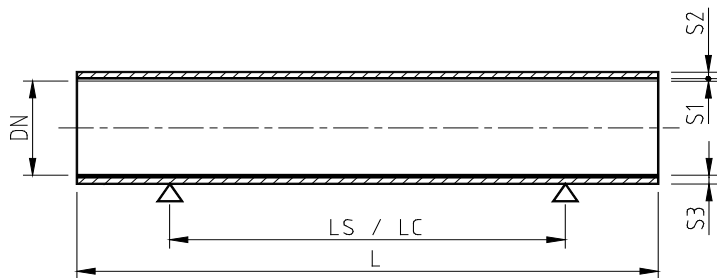
 ρ_{med} = density flow-through medium

pd = design pressure

Ls = maximum single span length; without insulation

Lc = maximum length continuous span; without insulation

Rb = Bending radius



PN 12,5														
LIQUIDS $\rho_{med} = 1$														
DN (mm)				1,00 x PN			0,75 x PN			0,5 x PN			(Working) L (mm)	DN (inch)
	S2 (mm)	S3 (mm)	pd = 12,50 bar(g)			pd = 9,38 bar(g)			pd = 6,25 bar(g)					
			Ls (mm)	Lc (mm)	Rb (m)	Ls (mm)	Lc (mm)	Rb (m)	Ls (mm)	Lc (mm)	Rb (m)			
250	3,0	4,2	3.800	4.880	219	3.800	5.680	135	3.800	5.680	98	12.000	10"	
300	3,8	5,0	4.200	5.740	238	4.200	6.280	155	4.200	6.280	115	12.000	12"	
350	3,8	5,0	3.800	4.640	427	4.380	6.520	217	4.380	6.540	146	12.000	14"	
400	4,6	5,8	4.520	5.540	412	4.740	7.080	232	4.740	7.080	162	12.000	16"	
450	5,3	6,5	5.060	6.300	417	5.060	7.580	250	5.060	7.580	178	12.000	18"	
500	5,3	6,5	4.340	5.320	655	5.200	7.620	318	5.200	7.800	210	12.000	20"	
600	6,8	8,0	5.560	6.820	614	5.800	8.680	347	5.800	8.680	242	12.000	24"	
700	7,6	8,8	5.420	6.620	842	6.200	9.260	432	6.200	9.280	290	12.000	28"	
750	8,4	9,6	5.940	7.280	821	6.460	9.660	446	6.460	9.660	306	12.000	30"	
800	8,4	9,6	5.260	6.440	1.124	6.560	9.460	522	6.560	9.820	340	12.000	32"	
900	9,9	11,1	6.300	7.720	1.036	7.040	10.540	545	7.040	10.540	370	12.000	36"	
1000	10,6	11,8	6.180	7.560	1.296	7.380	10.820	633	7.380	11.040	419	12.000	40"	
1100	11,4	12,6	6.040	7.400	1.600	7.680	10.980	725	7.680	11.500	469	12.000	44"	
1200	12,9	14,1	6.980	8.540	1.481	8.100	12.040	746	8.100	12.120	499	12.000	48"	
1300	13,7	14,9	6.860	8.400	1.761	8.380	12.180	836	8.380	12.540	548	12.000	52"	
1400	14,4	15,6	6.720	8.240	2.079	8.660	12.340	929	8.660	12.960	598	12.000	56"	
1500	16,0	17,2	7.580	9.280	1.937	9.040	13.280	949	9.040	13.520	628	12.000	60"	
1600	16,7	17,9	7.460	9.140	2.232	9.300	13.420	1.040	9.300	13.900	678	12.000	64"	

REMARKS:

Fabrication according to ISO 14692 (Filament-wound)

Plain end for jointing by lamination

DN = inside diameter

S1 = 1 mm (inside liner thickness)

S2 = structural wall thickness

S3 = total wall thickness with 1 mm liner and 0,2 mm topcoat

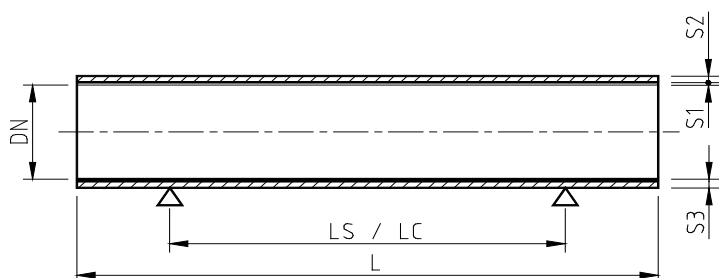
 ρ_{med} = density flow-through medium

pd = design pressure

Ls = maximum single span length; without insulation

Lc = maximum length continuous span; without insulation

Rb = Bending radius



PN 16													
LIQUIDS $\rho_{med} = 1$													
DN	1,00 x PN			0,75 x PN			0,5 x PN			(Working)	L	DN	
	S2	S3	pd = 16,00 bar(g)	pd = 12,00 bar(g)	pd = 8,00 bar(g)	Ls	Lc	Rb	Ls				Lc
(mm)	(mm)	(mm)	Ls	Lc	Rb	Ls	Lc	Rb	Ls	Lc	Rb	(mm)	(inch)
25	3,0	4,2	1.840	2.960	9	1.840	2.960	9	1.840	2.960	9	3.000	1"
32	3,0	4,2	2.020	3.180	11	2.020	3.180	11	2.020	3.180	11	3.000	1¼"
40	3,0	4,2	2.200	3.400	14	2.200	3.400	13	2.200	3.400	13	6.000	1½"
50	3,0	4,2	2.400	3.640	18	2.400	3.640	17	2.400	3.640	16	6.000	2"
65	3,0	4,2	2.620	3.920	24	2.620	3.920	22	2.620	3.920	21	6.000	2½"
80	3,0	4,2	2.780	4.160	31	2.780	4.160	28	2.780	4.160	25	6.000	3"
100	3,0	4,2	2.960	4.420	42	2.960	4.420	37	2.960	4.420	33	6.000	4"
125	3,0	4,2	3.140	4.700	61	3.140	4.700	50	3.140	4.700	42	6.000	5"
150	3,0	4,2	3.300	4.960	87	3.300	4.960	66	3.300	4.960	54	12.000	6"
200	3,0	4,2	3.580	4.660	190	3.580	5.360	113	3.580	5.360	80	12.000	8"
250	3,8	5,0	4.000	5.240	236	4.000	5.980	140	4.000	5.980	100	12.000	10"
300	4,6	5,8	4.380	5.760	282	4.380	6.560	168	4.380	6.560	120	12.000	12"
350	4,6	5,8	3.540	4.340	584	4.560	6.720	243	4.560	6.840	153	12.000	14"
400	5,3	6,5	4.040	4.940	597	4.920	7.340	268	4.920	7.340	173	12.000	16"
450	6,1	7,3	4.480	5.500	623	5.220	7.820	293	5.220	7.820	192	12.000	18"
500	6,8	8,0	4.880	5.980	655	5.520	8.280	320	5.520	8.280	211	12.000	20"
600	8,4	9,6	5.620	6.880	729	6.080	9.100	373	6.080	9.100	250	12.000	24"
700	9,1	10,3	5.060	6.200	1.146	6.480	9.560	482	6.480	9.680	305	12.000	28"
750	9,9	11,1	5.420	6.640	1.157	6.720	10.040	507	6.720	10.040	324	12.000	30"
800	10,6	11,8	5.760	7.060	1.177	6.960	10.400	532	6.960	10.400	344	12.000	32"
900	12,2	13,4	6.380	7.820	1.230	7.400	11.080	583	7.400	11.080	382	12.000	36"
1000	13,7	14,9	6.960	8.520	1.296	7.820	11.720	636	7.820	11.720	421	12.000	40"

REMARKS:

Fabrication according to ISO 14692 (Filament-wound)

Plain end for jointing by lamination

DN = inside diameter

S1 = 1 mm (inside liner thickness)

S2 = structural wall thickness

S3 = total wall thickness with 1 mm liner and 0,2 mm topcoat

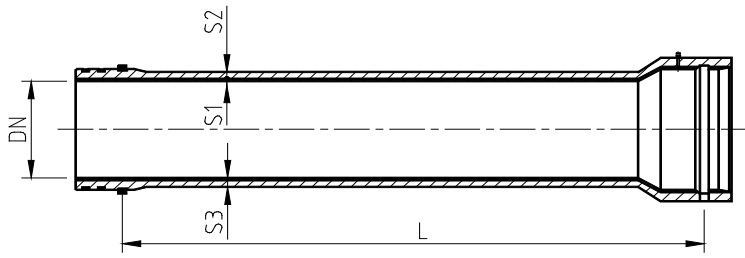
 ρ_{med} = density flow-through medium

pd = design pressure

Ls = maximum single span length; without insulation

Lc = maximum length continuous span; without insulation

Rb = Bending radius



DN (mm)	PN 10		PN 12,5		PN 16		(Working) L (mm)	DN (inch)
	S2 (mm)	S3 (mm)	S2 (mm)	S3 (mm)	S2 (mm)	S3 (mm)		
50	SEE PN 16				3,0	4,2	6.000	2"
65	SEE PN 16				3,0	4,2	6.000	2½"
80	SEE PN 16				3,0	4,2	6.000	3"
100	SEE PN 16				3,0	4,2	6.000	4"
125	SEE PN 16				3,0	4,2	6.000	5"
150	SEE PN 16				3,0	4,2	12.000	6"
200	SEE PN 16				3,0	4,2	12.000	8"
250	SEE PN 12,5		3,0	4,2	3,8	5,0	12.000	10"
300	3,0	4,2	3,8	5,0	4,6	5,8	12.000	12"
350	3,0	4,2	3,8	5,0	4,6	5,8	12.000	14"
400	3,8	5,0	4,6	5,8	5,3	6,5	12.000	16"
450	3,8	5,0	5,3	6,5	6,1	7,3	12.000	18"
500	4,6	5,8	5,3	6,5	6,8	8,0	12.000	20"
600	5,3	6,5	6,8	8,0	8,4	9,6	12.000	24"
700	6,1	7,3	7,6	8,8	9,1	10,3	12.000	28"
750	6,1	7,3	8,4	9,6	9,9	11,1	12.000	30"
800	6,8	8,0	8,4	9,6	10,6	11,8	12.000	32"
900	7,6	8,8	9,9	11,1	12,2	13,4	12.000	36"
1000	8,4	9,6	10,6	11,8	13,7	14,9	12.000	40"
1100	9,1	10,3	11,4	12,6	-	-	12.000	44"
1200	9,9	11,1	12,9	14,1	-	-	11.800	48"
1300	10,6	11,8	13,7	14,9	-	-	11.635	52"
1400	11,4	12,6	14,4	15,6	-	-	12.000	56"
1500	12,2	13,4	16,0	17,2	-	-	12.000	60"
1600	13,7	14,9	16,7	17,9	-	-	12.000	64"
1800	15,2	16,4	-	-	-	-	12.000	72"
2000	16,7	17,9	-	-	-	-	12.000	80"

REMARKS:

Fabrication according to ISO 14692 (Filament-wound)

DN = inside diameter

S1 = 1 mm (inside liner thickness)

S2 = structural wall thickness

S3 = total wall thickness with 1 mm liner and 0,2 mm topcoat

Up to DN 150 without testing nipple



DN (mm)	PN 10	PN 12,5	PN 16	DN (inch)
	SN (N/m ²)	SN (N/m ²)	SN (N/m ²)	
25	SEE PN 16		2.418.231	1"
32			1.289.985	1¼"
40			717.468	1½"
50			393.154	2"
65			190.792	2½"
80			106.593	3"
100			56.563	4"
125			29.810	5"
150			17.590	6"
200			7.605	8"
250	SEE PN 12,5	3.952	7.649	10"
300	2.310	4.477	7.679	12"
350	1.465	2.843	4.881	14"
400	1.916	3.292	5.199	16"
450	1.352	3.673	5.456	18"
500	1.702	2.691	5.668	20"
600	1.568	3.309	5.996	24"
700	1.477	2.867	4.922	28"
750	1.204	3.101	5.088	30"
800	1.411	2.562	5.237	32"
900	1.361	2.968	5.492	36"
1000	1.322	2.707	5.701	40"
1100	1.290	2.505	-	44"
1200	1.264	2.806	-	48"
1300	1.243	2.623	-	52"
1400	1.224	2.472	-	56"
1500	1.209	2.712	-	60"
1600	1.416	2.571	-	64"
1800	1.366	-	-	72"
2000	1.326	-	-	80"

REMARKS:

DN = inside diameter

 SN = pipe hoop stiffness (N/m²)



DN (mm)	PN 10	PN 12,5	PN 16	DN (inch)
	Wp (kg/m)	Wp (kg/m)	Wp (kg/m)	
25	SEE PN 16		0,7	1"
32			0,9	1¼"
40			1,1	1½"
50			1,4	2"
65			1,8	2½"
80			2,1	3"
100			2,6	4"
125			3,3	5"
150			3,9	6"
200			5,2	8"
250	SEE PN 12,5	6,4	7,6	10"
300	7,7	9,1	10,5	12"
350	9,0	10,6	12,2	14"
400	12,1	14,0	15,8	16"
450	13,6	17,8	19,9	18"
500	17,4	19,7	24,4	20"
600	23,6	29,2	34,8	24"
700	30,7	37,2	43,8	28"
750	32,9	43,3	50,3	30"
800	38,8	46,2	57,4	32"
900	47,7	60,3	72,8	36"
1000	57,6	71,5	90,1	40"
1100	68,4	83,7	-	44"
1200	80,1	102,3	-	48"
1300	92,7	116,8	-	52"
1400	106,2	132,2	-	56"
1500	120,7	155,4	-	60"
1600	143,4	173,1	-	64"
1800	177,8	-	-	72"
2000	215,8	-	-	80"

REMARKS:

DN = inside diameter

Wp = pipe mass

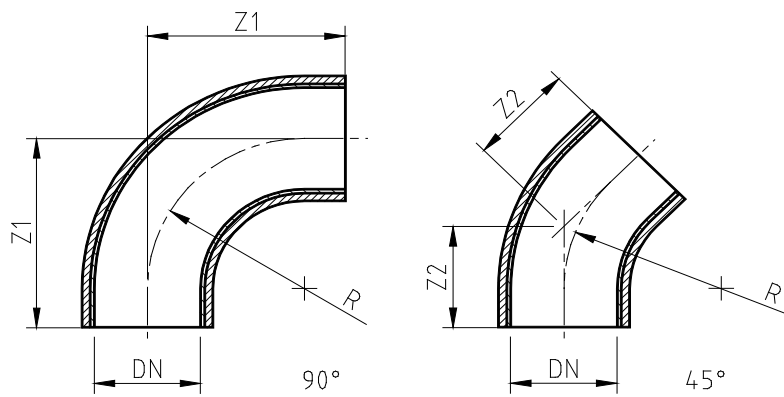


DN (mm)	PN 10	PN 12,5	PN 16	DN (inch)
	P _c (bar)	P _c (bar)	P _c (bar)	
25	SEE PN 16		304,0	1"
32			132,1	1¼"
40			90,1	1½"
50			49,4	2"
65			23,9	2½"
80			13,4	3"
100			7,1	4"
125			3,7	5"
150			2,2	6"
200			0,9	8"
250	SEE PN 12,5	0,4	0,9	10"
300	0,2	0,5	0,9	12"
350	0,1	0,3	0,6	14"
400	0,2	0,4	0,6	16"
450	0,1	0,4	0,6	18"
500	0,2	0,3	0,7	20"
600	0,1	0,4	0,7	24"
700	0,1	0,3	0,6	28"
750	0,1	0,3	0,6	30"
800	0,1	0,3	0,6	32"
900	0,1	0,3	0,6	36"
1000	0,1	0,3	0,7	40"
1100	0,1	0,3	-	44"
1200	0,1	0,3	-	48"
1300	0,1	0,3	-	52"
1400	0,1	0,3	-	56"
1500	0,1	0,3	-	60"
1600	0,1	0,3	-	64"
1800	0,1	0,3	-	72"
2000	0,1	0,3	-	80"

REMARKS:

DN = inside diameter

 P_c = external collapse pressure short term (safety factor 1,5)



DN (mm)	PN 6 / PN 10 / PN 16		DN (inch)
	Z1 (mm)	Z2 (mm)	
25	110	70	1"
32	130	80	1¼"
40	150	90	1½"
50	180	105	2"
65	135	85	2½"
80	165	100	3"
100	205	115	4"
125	245	135	5"
150	285	150	6"
200	365	190	8"
250	415	225	10"
300	520	245	12"
350	600	275	14"
400	670	320	16"
450	770	365	18"
500	850	380	20"
600	1.020	495	24"
700	1.190	575	28"
750	1.265	615	30"
800	1.305	650	32"
900	1.525	735	36"
1000	1.695	820	40"

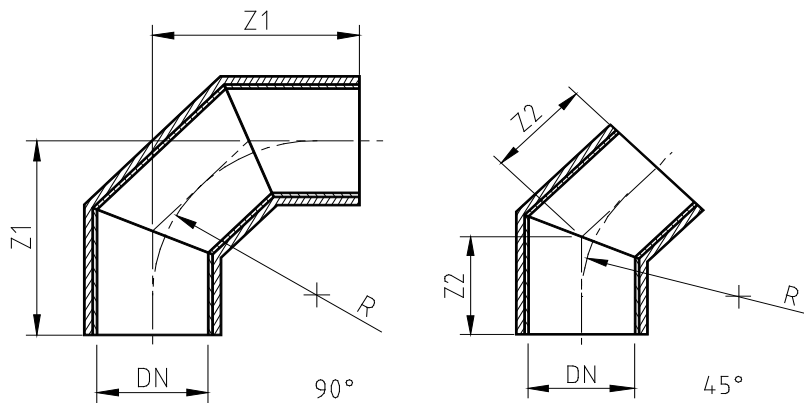
REMARKS:

DN = inside diameter

 $R \approx 1,5 \times DN$

Z1 = element Length for 90° elbow

Z2 = element Length for 45° elbow



DN (mm)	PN 6 / PN 10 / PN 16		DN (inch)
	Z1 (mm)	Z2 (mm)	
25	110	70	1"
32	130	80	1¼"
40	150	90	1½"
50	180	105	2"
65	135	85	2½"
80	165	100	3"
100	205	115	4"
125	245	135	5"
150	285	150	6"
200	365	190	8"
250	415	225	10"
300	520	245	12"
350	600	275	14"
400	670	320	16"
450	770	365	18"
500	850	380	20"
600	1.020	495	24"
700	1.190	575	28"
750	1.265	615	30"
800	1.305	650	32"
900	1.525	735	36"
1000	1.695	820	40"
1100	1.800	683	44"
1200	1.950	746	48"
1300	2.100	808	52"
1400	2.250	870	56"
1500	2.400	932	60"
1600	2.550	994	64"
1800	2.900	1.118	72"
2000	3.200	1.243	80"

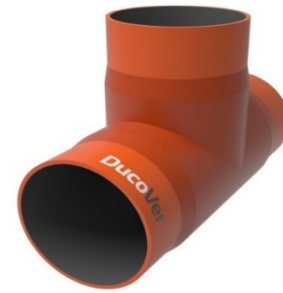
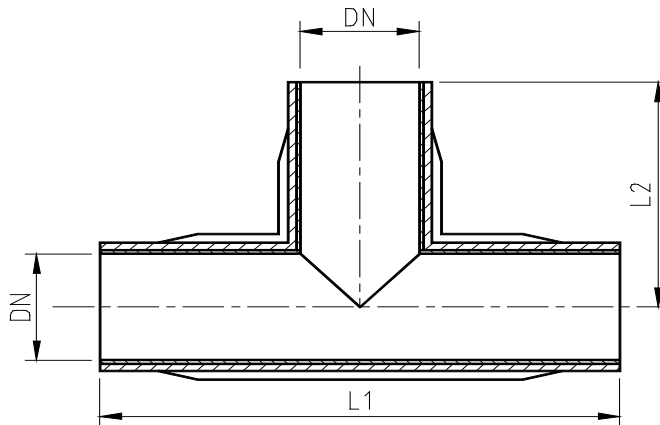
REMARKS:

DN = inside diameter

 $R = 1,5 \times DN$

Z1 = element Length for 90° elbow

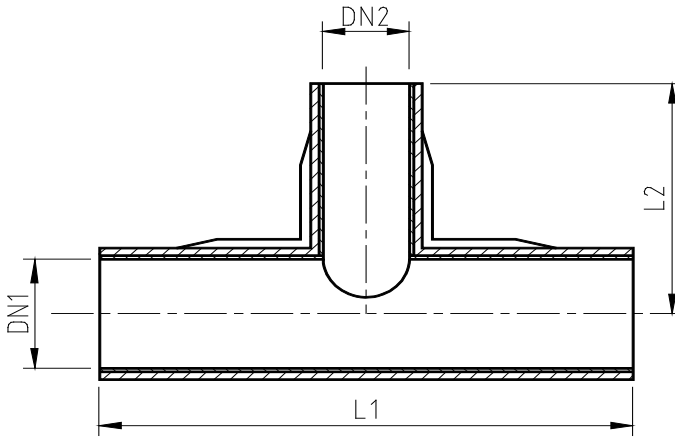
Z2 = element Length for 45° elbow



DN (mm)	PN 6 / PN 10 / PN 16		DN (inch)
	L1 (mm)	L2 (mm)	
25	440	215	1"
32	440	220	1¼"
40	450	225	1½"
50	480	235	2"
65	510	250	2½"
80	530	255	3"
100	580	270	4"
125	620	285	5"
150	680	310	6"
200	700	370	8"
250	820	440	10"
300	990	520	12"
350	1.110	590	14"
400	1.240	655	16"
450	1.400	735	18"
500	1.520	810	20"
600	1.790	945	24"
700	2.080	1.085	28"
750	2.200	1.155	30"
800	2.320	1.225	32"
900	2.610	1.385	36"
1000	2.890	1.525	40"

REMARKS:

DN = inside diameter
L1 = run pipe length
L2 = branch pipe length



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16		DN2 (inch)	DN1 (inch)
		L1 (mm)	L2 (mm)		
32	25	440	220	1"	1¼"
40	25	440	225	1"	1½"
	32	440	225	1¼"	
50	25	450	230	1"	2"
	32	450	230	1¼"	
	40	460	230	1½"	
65	32	460	235	1¼"	2½"
	40	470	235	1½"	
	50	490	240	2"	
80	40	470	245	1½"	3"
	50	490	250	2"	
	65	500	255	2½"	
100	50	500	260	2"	4"
	65	510	265	2½"	
	80	520	265	3"	
125	65	520	275	2½"	5"
	80	530	275	3"	
	100	550	280	4"	
150	80	550	290	3"	6"
	100	570	295	4"	
	125	590	300	5"	
200	100	620	325	4"	8"
	125	630	330	5"	
	150	670	340	6"	
250	125	670	360	5"	10"
	150	710	370	6"	
	200	730	385	8"	
300	150	770	405	6"	12"
	200	820	420	8"	
	250	870	435	10"	

DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16		DN2 (inch)	DN1 (inch)
		L1 (mm)	L2 (mm)		
350	200	890	445	8"	14"
	250	940	490	10"	
	300	1.020	545	12"	
400	250	1.000	515	10"	16"
	300	1.600	570	12"	
	350	1.150	615	14"	
450	300	1.150	595	12"	18"
	350	1.200	640	14"	
	400	1.290	680	16"	
500	350	1.270	670	14"	20"
	400	1.320	710	16"	
	450	1.430	765	18"	
600	400	1.470	760	16"	24"
	450	1.520	815	18"	
	500	1.590	860	20"	
700	450	1.660	865	18"	28"
	500	1.710	910	20"	
	600	1.870	995	24"	
750	500	1.780	935	20"	30"
	600	1.900	1.020	24"	
	700	2.110	1.110	28"	
800	500	1.850	960	20"	32"
	600	1.950	1.045	24"	
	700	2.140	1.135	28"	
900	600	2.120	1.100	24"	36"
	700	2.230	1.190	28"	
	800	2.410	1.280	32"	
1000	700	2.370	1.240	28"	40"
	800	2.490	1.330	32"	
	900	2.690	1.435	36"	

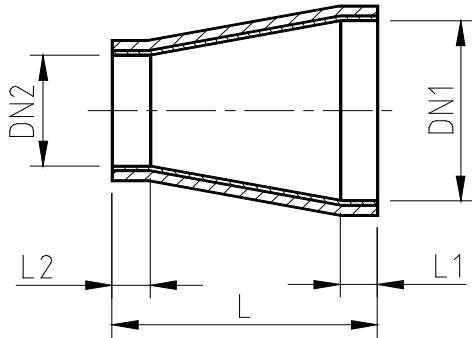
REMARKS:

DN1 = inside diameter run pipe

DN2 = inside diameter branch pipe

L1 = run pipe length

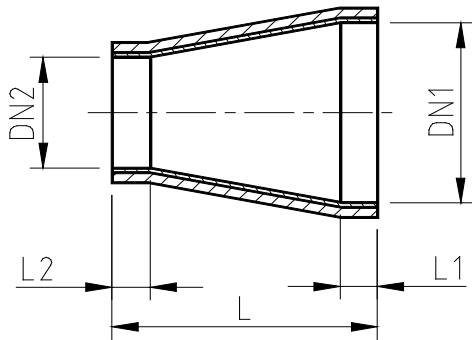
L2 = branch pipe length



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16			DN2 (inch)	DN1 (inch)
		L (mm)	L1 (mm)	L2 (mm)		
32	25	180	77	84	1"	1¼"
40	25	205	83	83	1"	1½"
	32	200	86	93	1¼"	
50	25	235	90	80	1"	2"
	32	230	93	90	1¼"	
	40	205	89	90	1½"	
65	32	260	97	78	1¼"	2½"
	40	235	94	76	1½"	
	50	210	88	83	2"	
80	40	275	97	75	1½"	3"
	50	245	88	79	2"	
	65	210	86	85	2½"	
100	50	325	109	87	2"	4"
	65	285	104	90	2½"	
	80	250	102	96	3"	
125	65	350	108	87	2½"	5"
	80	310	104	90	3"	
	100	285	111	109	4"	
150	80	375	112	82	3"	6"
	100	350	119	102	4"	
	125	310	128	117	5"	
200	100	495	139	98	4"	8"
	125	430	134	103	5"	
	150	370	128	113	6"	
250	125	575	153	100	5"	10"
	150	510	144	108	6"	
	200	400	143	128	8"	
300	150	655	164	105	6"	12"
	200	540	161	121	8"	
	250	435	163	143	10"	

REMARKS:

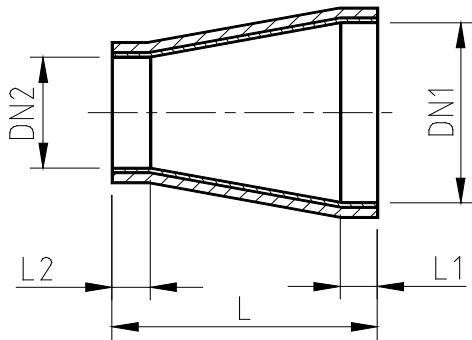
- DN1 = inside diameter larger pipe
- DN2 = inside diameter smaller pipe
- L = overall length
- L1 = straight length larger pipe
- L2 = straight length smaller pipe



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16			DN2 (inch)	DN1 (inch)
		L (mm)	L1 (mm)	L2 (mm)		
350	200	665	166	113	8"	14"
	250	550	163	129	10"	
	300	440	161	150	12"	
400	250	695	179	130	10"	16"
	300	580	174	148	12"	
	350	450	168	153	14"	
450	300	680	170	124	12"	18"
	350	565	170	137	14"	
	400	450	169	152	16"	
500	350	710	184	140	14"	20"
	400	730	255	217	16"	
	450	485	184	172	18"	
600	450	785	219	180	18"	24"
	500	665	217	190	20"	
700	500	965	253	197	20"	28"
	600	735	253	224	24"	
750	600	885	270	229	24"	30"
	700	655	269	257	28"	
800	600	1.030	284	231	24"	32"
	700	805	286	261	28"	
	750	685	284	272	30"	
900	700	1.110	326	269	28"	36"
	750	990	324	280	30"	
	800	875	325	292	32"	
1000	750	1.290	360	286	30"	40"
	800	1.175	361	299	32"	
	900	950	361	331	36"	

REMARKS:

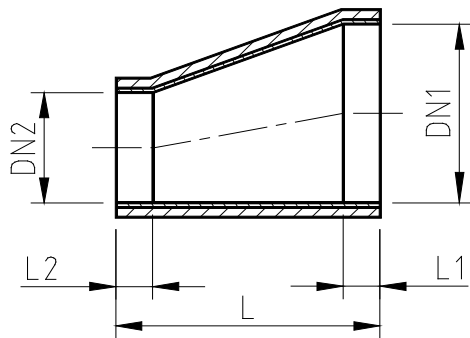
- DN1 = inside diameter larger pipe
- DN2 = inside diameter smaller pipe
- L = overall length
- L1 = straight length larger pipe
- L2 = straight length smaller pipe



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16			DN2 (inch)	DN1 (inch)
		L (mm)	L1 (mm)	L2 (mm)		
1100	800	1.290	287	231	32"	44"
	900	1.050	287	248	36"	
	1000	815	289	268	40"	
1200	900	1.340	313	255	36"	48"
	1000	1.105	315	275	40"	
	1100	865	314	293	44"	
1300	1000	1.390	338	280	40"	52"
	1100	1.155	339	301	44"	
	1200	915	338	319	48"	
1400	1100	1.445	366	307	44"	56"
	1200	1.210	367	328	48"	
	1300	970	366	346	52"	
1500	1200	1.500	393	335	48"	60"
	1300	1.260	393	352	52"	
	1400	1.020	391	371	56"	
1600	1300	1.555	421	362	52"	64"
	1400	1.315	419	381	56"	
	1500	1.080	420	402	60"	
1800	1400	1.670	346	295	56"	72"
	1500	1.425	346	307	60"	
	1600	1.180	347	318	64"	
2000	1500	1.980	379	314	60"	80"
	1600	1.735	380	326	64"	
	1800	1.245	378	352	72"	

REMARKS:

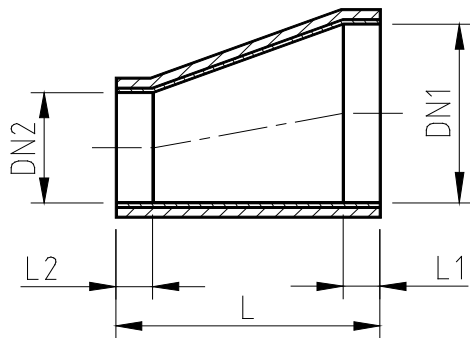
- DN1 = inside diameter larger pipe
- DN2 = inside diameter smaller pipe
- L = overall length
- L1 = straight length larger pipe
- L2 = straight length smaller pipe



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16			DN2 (inch)	DN1 (inch)
		L (mm)	L1 (mm)	L2 (mm)		
32	25	180	77	85	1"	1¼"
40	25	205	83	84	1"	1½"
	32	200	92	88	1¼"	
50	25	235	95	78	1"	2"
	32	230	99	86	1¼"	
	40	205	90	90	1½"	
65	32	260	96	82	1¼"	2½"
	40	235	93	80	1½"	
	50	210	88	84	2"	
80	40	275	96	79	1½"	3"
	50	245	88	82	2"	
	65	210	87	85	2½"	
100	50	325	113	88	2"	4"
	65	285	103	95	2½"	
	80	250	102	88	3"	
125	65	350	112	89	2½"	5"
	80	310	108	90	3"	
	100	285	116	107	4"	
150	80	375	115	86	3"	6"
	100	350	124	102	4"	
	125	310	128	120	5"	
200	100	495	147	100	4"	8"
	125	430	138	106	5"	
	150	370	133	113	6"	
250	125	575	160	105	5"	10"
	150	510	147	115	6"	
	200	400	148	128	8"	
300	150	655	171	112	6"	12"
	200	540	165	127	8"	
	250	435	165	146	10"	

REMARKS:

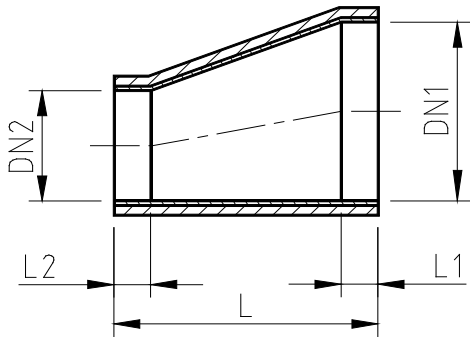
- DN1 = inside diameter larger pipe
- DN2 = inside diameter smaller pipe
- L = overall length
- L1 = straight length larger pipe
- L2 = straight length smaller pipe



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16			DN2 (inch)	DN1 (inch)
		L (mm)	L1 (mm)	L2 (mm)		
350	200	665	173	120	8"	14"
	250	550	168	134	10"	
	300	440	164	152	12"	
400	250	695	187	136	10"	16"
	300	580	180	152	12"	
	350	450	171	155	14"	
450	300	685	180	133	12"	18"
	350	575	180	147	14"	
	400	465	180	161	16"	
500	350	715	195	148	14"	20"
	400	730	261	221	16"	
	450	500	195	181	18"	
600	450	795	232	191	18"	24"
	500	685	233	204	20"	
700	500	980	272	212	20"	28"
	600	760	271	241	24"	
750	600	905	288	245	24"	30"
	700	690	290	276	28"	
800	600	1.055	308	251	24"	32"
	700	835	306	281	28"	
	750	725	307	294	30"	
900	700	1.130	346	288	28"	36"
	750	1.020	347	301	30"	
	800	910	348	314	32"	
1000	750	1.315	386	310	30"	40"
	800	1.205	386	323	32"	
	900	990	386	356	36"	

REMARKS:

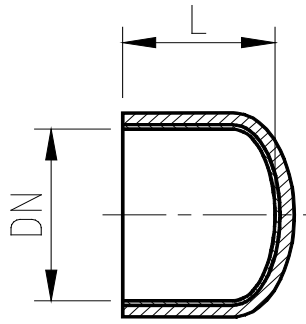
- DN1 = inside diameter larger pipe
- DN2 = inside diameter smaller pipe
- L = overall length
- L1 = straight length larger pipe
- L2 = straight length smaller pipe



DN1 (mm)	DN2 (mm)	PN 6 / PN 10 / PN 16			DN2 (inch)	DN1 (inch)
		L (mm)	L1 (mm)	L2 (mm)		
1100	800	1.310	314	253	32"	44"
	900	1.080	312	272	36"	
	1000	855	314	293	40"	
1200	900	1.360	340	277	36"	48"
	1000	1.135	341	298	40"	
	1100	905	339	318	44"	
1300	1000	1.425	372	310	40"	52"
	1100	1.200	372	332	44"	
	1200	970	371	351	48"	
1400	1100	1.475	397	335	44"	56"
	1200	1.245	395	354	48"	
	1300	1.020	397	375	52"	
1500	1200	1.540	430	367	48"	60"
	1300	1.310	429	385	52"	
	1400	1.085	429	408	56"	
1600	1300	1.590	455	392	52"	64"
	1400	1.365	455	414	56"	
	1500	1.140	456	436	60"	
1800	1400	1.705	385	329	56"	72"
	1500	1.470	385	342	60"	
	1600	1.235	385	354	64"	
2000	1500	2.000	416	346	60"	80"
	1600	1.765	416	358	64"	
	1800	1.300	416	388	72"	

REMARKS:

- DN1 = inside diameter larger pipe
- DN2 = inside diameter smaller pipe
- L = overall length
- L1 = straight length larger pipe
- L2 = straight length smaller pipe

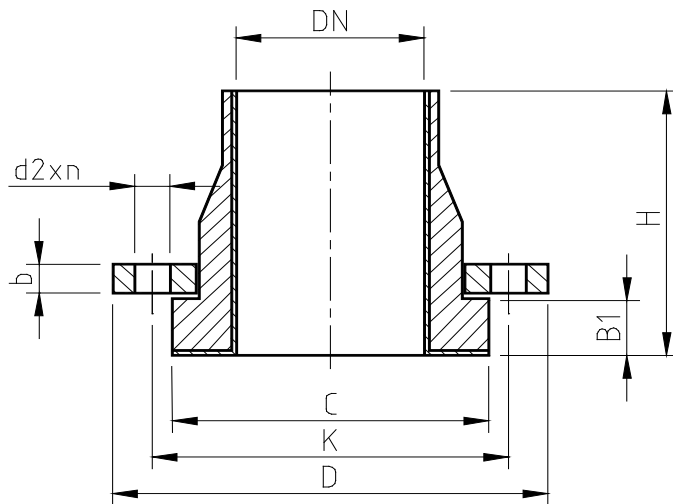


DN (mm)	PN 6	PN 10	PN 16	DN (inch)		
	L (mm)	L (mm)	L (mm)			
25	SEE PN 16		30	1"		
32			35	1¼"		
40			35	1½"		
50			40	2"		
65			45	2½"		
80			50	3"		
100			55	4"		
125			60	5"		
150			SEE PN 10	65	75	6"
200				80	110	8"
250	90	100	130	10"		
300	105	140	160	12"		
350	130	160	185	14"		
400	155	180	210	16"		
450	175	205	240	18"		
500	200	225	260	20"		
600	250	265	310	24"		
700	280	310	360	28"		
750	305	345	390	30"		
800	315	350	420	32"		
900	360	405	470	36"		
1000	390	450	515	40"		
1100	435	490	-	44"		
1200	485	535	-	48"		
1300	515	575	-	52"		
1400	560	630	-	56"		
1500	595	675	-	60"		
1600	625	700	-	64"		
1800	715	795	-	72"		
2000	795	880	-	80"		

REMARKS:

DN = inside diameter

L = total length incl. 1:6 taper

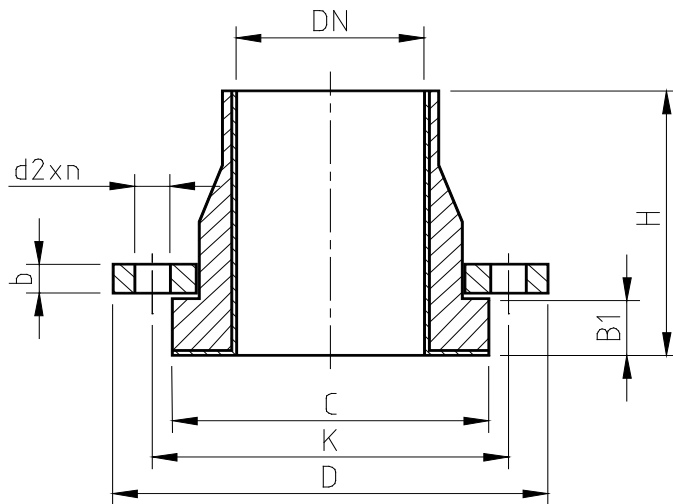


STUB END with L.J. FLANGE - STEEL GALVANISED PN 10 - DIN PN 10 DRILLING									
DN (mm)	C (mm)	B1 (mm)	H (mm)	D (mm)	K (mm)	b (mm)	d2 x n (mm x pc)	PN (barg)	DN (mm)
25									25
32									32
40									40
50									50
65									65
80									80
100									100
125									125
150									150
200	268	34	260	340	295	25	22 x 8	10	200
250	320	37	280	395	350	26	22 x 12	10	250
300	370	40	320	445	400	27	22 x 12	10	300
350	430	42	360	505	460	25	22 x 16	10	350
400	482	44	400	565	515	27	25 x 16	10	400
450	531	46	460	615	565	27	25 x 20	10	450
500	585	48	480	670	620	28	25 x 20	10	500
600	685	50	560	780	725	28	30 x 20	10	600
700	800	52	640	895	840	30	30 x 24	10	700
750	-	-	-	-	-	-	-	-	750
800	905	54	700	1.015	950	33	33 x 24	10	800
900	1.005	56	780	1.115	1.050	35	33 x 28	10	900
1000	1.110	58	860	1.230	1.160	35	36 x 28	10	1000
1100	-	-	-	-	-	-	-	-	1100
1200	1.338	64	640	1.455	1.380	38	39 x 32	10	1200
1300	-	-	-	-	-	-	-	-	1300
1400	1.545	72	740	1.675	1.590	42	42 x 36	10	1400
1500	-	-	-	-	-	-	-	-	1500
1600	1.768	78	840	1.915	1.820	46	48 x 40	10	1600
1800	1.968	84	920	2.115	2.020	50	48 x 44	10	1800
2000	2.178	90	1.020	2.325	2.230	54	48 x 48	10	2000

REMARKS:

DN = inside diameter
 B1 = collar thickness incl. liner
 C = outside diameter collar
 D = outside diameter flange
 K = diameter bolt circle

b = thickness of flange
 d2 = diameter bolt holes
 n = number of bolt holes
 Drilling = according to EN 1092-1 / PN 10
 For spool building, flanges are directly moulded to pipe or fitting



STUB END with L.J. FLANGE - STEEL GALVANISED PN 16 - DIN PN 16 DRILLING									
DN (mm)	C (mm)	B1 (mm)	H (mm)	D (mm)	K (mm)	b (mm)	d2 x n (mm x pc)	PN (barg)	DN (mm)
25	68	20	160	115	85	16	14 x 4	16	25
32	78	20	160	140	100	16	18 x 4	16	32
40	88	21	160	150	110	16	18 x 4	16	40
50	102	22	180	165	125	18	18 x 4	16	50
65	122	24	180	185	145	18	18 x 4 ¹⁾	16	65
80	138	24	180	200	160	20	18 x 8	16	80
100	158	26	200	220	180	20	18 x 8	16	100
125	188	29	220	250	210	22	18 x 8	16	125
150	212	30	240	285	240	22	22 x 8	16	150
200	268	37	260	340	295	26	22 x 12	16	200
250	325	41	280	405	355	27	25 x 12	16	250
300	378	44	320	460	410	32	25 x 12	16	300
350	437	46	360	520	470	35	25 x 16	16	350
400	488	48	400	580	525	33	30 x 16	16	400
450	552	51	460	640	585	32	30 x 20	16	450
500	613	57	480	715	650	35	33 x 20	16	500
600	730	60	560	840	770	37	36 x 20	16	600
700	800	67	640	910	840	40	36 x 24	16	700
750	-	-	-	-	-	-	-	-	750
800	907	69	700	1.025	950	52	39 x 24	16	800
900	1.007	77	780	1.125	1.050	58	39 x 28	16	900
1000	1.124	80	860	1.255	1.170	64	42 x 28	16	1000

REMARKS:

DN = inside diameter

B1 = collar thickness incl. liner

C = outside diameter collar

D = outside diameter flange

K = diameter bolt circle

b = thickness of flange

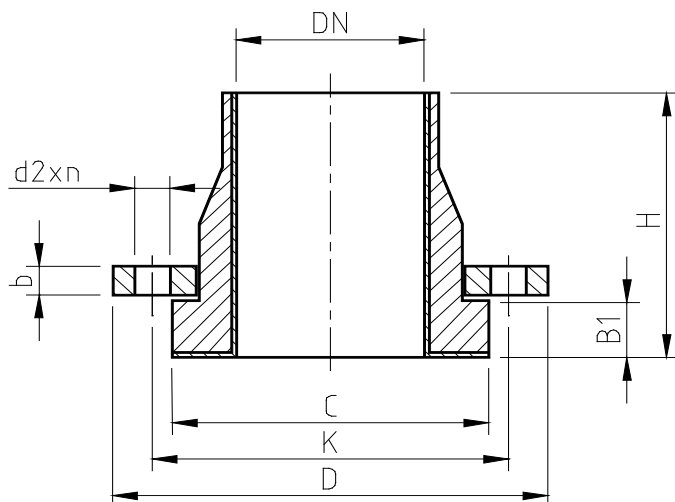
d2 = diameter bolt holes

n = number of bolt holes

¹⁾ also available with 8 holes Ø18

Drilling = according to EN 1092-1 / PN 16

For spool building, flanges are directly moulded to pipe or fitting



STUB END with L.J. FLANGE - STEEL GALVANISED PN 10 - ANSI 150 [#] DRILLING									
DN (inch)	C (mm)	B1 (mm)	H (mm)	D (mm)	K (mm)	b (mm)	d2 x n (mm x pc)	PN (barg)	DN (inch)
1"									1"
1¼"									1¼"
1½"									1½"
2"									2"
2½"									2½"
3"									3"
4"									4"
5"									5"
6"									6"
8"									8"
10"									10"
12"									12"
14"	438	42	360	533,4	476,2	28	28 x 12	16	14"
16"	503	44	400	596,9	539,7	33	28 x 16	16	16"
18"	538	46	460	635,0	577,8	33	32 x 16	16	18"
20"	593	48	480	698,5	635,0	37	32 x 20	10	20"
24"	708	50	560	812,6	749,3	37	35 x 20	10	24"
28"	820	52	640	927,1	863,6	37	35 x 28	10	28"
30"	867	53	660	984,2	914,4	38	35 x 28	10	30"
32"	928	54	700	1.060,5	977,9	40	41 x 28	10	32"
36"	1.035	56	780	1.168,4	1.085,8	35	41 x 32	10	36"
40"	1.148	58	860	1.289,1	1.200,2	35	41 x 36	10	40"

REMARKS:

DN = inside diameter

B1 = collar thickness incl. liner

C = outside diameter collar

D = outside diameter flange

K = diameter bolt circle

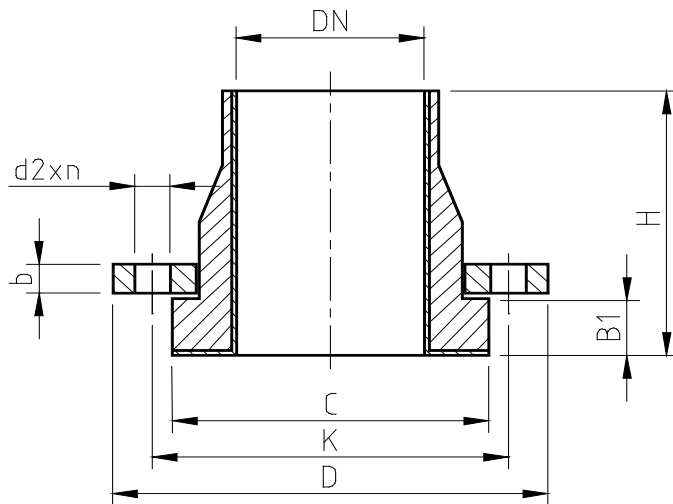
b = thickness of flange

d2 = diameter bolt holes

n = number of bolt holes

Drilling = according to ANSI B16.5 150Lbs

For spool building, flanges are directly moulded to pipe or fitting



DN (inch)	STUB END with L.J. FLANGE - STEEL GALVANISED PN 16 - ANSI 150 [#] DRILLING							PN (barg)	DN (inch)
	C (mm)	B1 (mm)	H (mm)	D (mm)	K (mm)	b (mm)	d2 x n (mm x pc)		
1"	61	20	160	107,9	79,4	14	16 x 4	16	1"
1¼"	70	20	160	117,5	88,9	16	16 x 4	16	1¼"
1½"	80	21	160	127,0	98,4	17	16 x 4	16	1½"
2"	98	22	180	152,4	120,6	18	19 x 4	16	2"
2½"	117	24	180	177,8	139,7	19	19 x 4	16	2½"
3"	130	24	180	190,5	152,4	19	19 x 4	16	3"
4"	169	26	200	228,6	190,5	19	19 x 8	16	4"
5"	189	29	220	254,0	215,9	19	22 x 8	16	5"
6"	212	30	240	279,4	241,3	19	22 x 8	16	6"
8"	270	37	260	342,9	298,4	20	22 x 8	16	8"
10"	328	41	280	406,4	361,9	23	25 x 12	16	10"
12"	398	44	320	482,6	431,8	25	25 x 12	16	12"
14"	438	46	360	533,4	476,2	28	28 x 12	16	14"
16"	503	48	400	596,9	539,7	33	28 x 16	16	16"
18"	538	51	460	635,0	577,8	33	32 x 16	16	18"
20"	593	57	480	698,5	635,0	37	32 x 20	16	20"
24"	708	60	560	812,6	749,3	37	35 x 20	16	24"
28"	820	67	640	927,1	863,6	37	35 x 28	16	28"
30"	867	68	660	984,2	914,4	38	35 x 28	16	30"
32"	928	69	700	1.060,5	977,9	40	41 x 28	16	32"
36"	1.035	77	780	1.168,4	1.085,8	35	41 x 32	16	36"
40"	1.148	80	860	1.289,1	1.200,2	35	41 x 36	16	40"

REMARKS:

DN = inside diameter

B1 = collar thickness incl. liner

C = outside diameter collar

D = outside diameter flange

K = diameter bolt circle

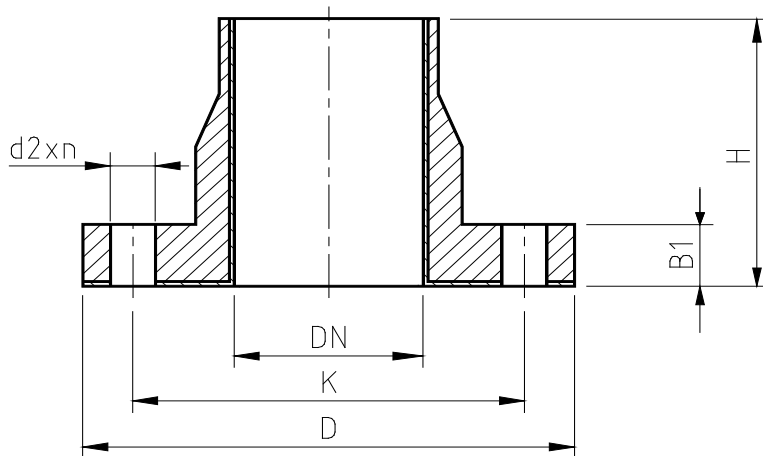
b = thickness of flange

d2 = diameter bolt holes

n = number of bolt holes

Drilling = according to ANSI B16.5 150Lbs

For spool building, flanges are directly moulded to pipe or fitting



DN (mm)	PN 10 - DIN PN 10 DRILLING				PN 16 - DIN PN 16 DRILLING				H (mm)	DN (mm)
	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)		
25	SEE DIN PN 16				115	85	24	14 x 4	160	25
32					140	100	24	18 x 4	160	32
40					150	110	25	18 x 4	160	40
50					165	125	26	18 x 4	180	50
65					185	145	28	18 x 4 ¹⁾	180	65
80					200	160	28	18 x 8	180	80
100					220	180	31	18 x 8	200	100
125					250	210	34	18 x 8	220	125
150					285	240	36	22 x 8	240	150
200					340	295	40	22 x 8	340	295
250	395	350	44	22 x 12	405	355	49	26 x 12	280	250
300	445	400	48	22 x 12	460	410	52	26 x 12	320	300
350	505	460	50	22 x 16	520	470	55	26 x 16	360	350
400	565	515	52	25 x 16	580	525	57	30 x 16	400	400
450	615	565	55	25 x 20	640	585	61	30 x 20	460	450
500	670	620	57	25 x 20	715	650	68	33 x 20	480	500
600	780	725	60	30 x 20	840	770	72	36 x 20	560	600
700	895	840	62	30 x 24	-	-	-	-	640	700
750	-	-	-	-	-	-	-	-	-	750
800	1.015	950	64	33 x 24	-	-	-	-	700	800
900	1.115	1.050	67	33 x 28	-	-	-	-	780	900
1000	1.230	1.160	69	36 x 28	-	-	-	-	860	1000
1100	-	-	-	-	-	-	-	-	-	1100
1200	-	-	-	-	-	-	-	-	-	1200
1300	-	-	-	-	-	-	-	-	-	1300
1400	-	-	-	-	-	-	-	-	-	1400
1500	-	-	-	-	-	-	-	-	-	1500
1600	-	-	-	-	-	-	-	-	-	1600
1800	-	-	-	-	-	-	-	-	-	1800
2000	-	-	-	-	-	-	-	-	-	2000

REMARKS:

DN = inside diameter

B1 = thickness of flange incl. liner

D = outside diameter flange

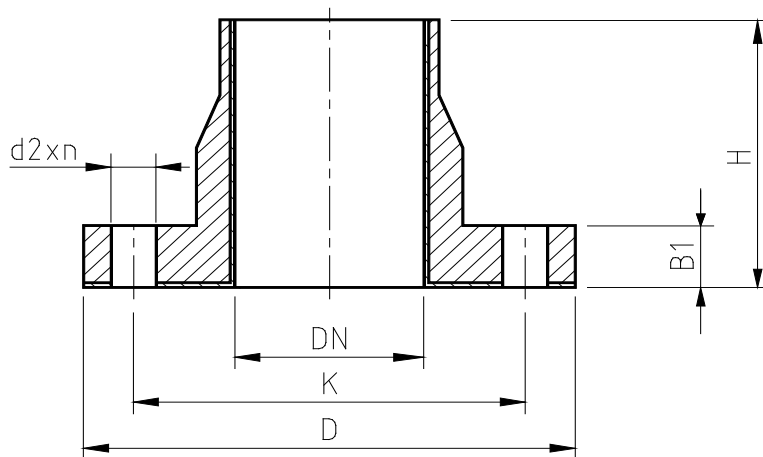
K = diameter bolt circle

n = number of bolt holes

¹⁾ also available with 8 holes Ø18

Drilling = according to EN 1092-1 / PN 10 and PN 16

For spool building, flanges are directly moulded to pipe or fitting



DN (inch)	PN 10 - ANSI 150# DRILLING				PN 16 - ANSI 150# DRILLING				H (mm)	DN (inch)
	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)		
1"					108,0	79,4	24	16 x 4	160	1"
1¼"					117,5	88,9	24	16 x 4	160	1¼"
1½"					127,0	98,4	25	16 x 4	160	1½"
2"					152,4	120,6	26	19 x 4	180	2"
2½"					177,8	139,7	28	19 x 4	180	2½"
3"					190,5	152,4	28	19 x 4	180	3"
4"					228,6	190,5	31	19 x 8	200	4"
5"					254,0	215,9	34	22 x 8	220	5"
6"					279,4	241,3	36	22 x 8	240	6"
8"					342,9	298,4	44	22 x 8	260	8"
10"					406,4	361,9	49	25 x 12	280	10"
12"					482,6	431,8	52	25 x 12	320	12"
14"	533,4	476,2	50	28 x 12	533,4	476,2	55	28 x 12	360	14"
16"	596,9	539,7	52	28 x 16	596,9	539,7	57	28 x 16	400	16"
18"	635,0	577,8	55	32 x 16	635,0	577,8	61	32 x 16	460	18"
20"	698,5	635,0	57	32 x 20	698,5	635,0	68	32 x 20	480	20"
24"	812,6	749,3	60	35 x 20	812,6	749,3	72	35 x 20	560	24"
28"	927,1	863,6	62	35 x 28	-	-	-	-	640	28"
30"	984,2	914,4	63	35 x 28	-	-	-	-	660	30"
32"	1.060,5	977,9	64	41 x 28	-	-	-	-	700	32"
36"	1.168,4	1.085,8	67	41 x 32	-	-	-	-	780	36"
40"	1.289,1	1.200,2	69	41 x 36	-	-	-	-	860	40"

REMARKS:

DN = inside diameter

B1 = thickness of flange incl. liner

D = outside diameter flange

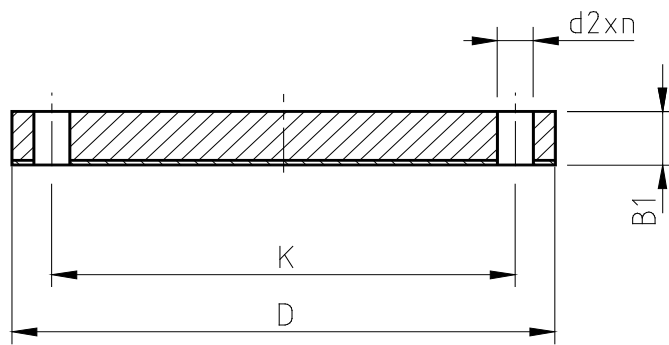
K = diameter bolt circle

d2 = diameter bolt holes

n = number of bolt holes

Drilling = according to ANSI B16.5 150lbs

For spool building, flanges are directly moulded to pipe or fitting



DN (mm)	PN 10 - DIN PN 10 DRILLING				PN 16 - DIN PN 16 DRILLING				DN (mm)
	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)	
25	SEE DIN PN 16				115	85	24	14 x 4	25
32					140	100	24	18 x 4	32
40					150	110	25	18 x 4	40
50					165	125	26	18 x 4	50
65					185	145	28	18 x 4 ¹⁾	65
80					200	160	28	18 x 8	80
100					220	180	31	18 x 8	100
125					250	210	34	18 x 8	125
150					285	240	36	22 x 8	150
200					340	295	44	22 x 12	340
250	395	350	49	26 x 12	405	355	49	26 x 12	250
300	445	400	52	26 x 12	460	410	52	26 x 12	300
350	505	460	55	26 x 16	520	470	55	26 x 16	350
400	565	515	57	30 x 16	580	525	57	30 x 16	400
450	615	565	61	30 x 20	640	585	61	30 x 20	450
500	670	620	68	33 x 20	715	650	68	33 x 20	500
600	780	725	72	36 x 20	840	770	72	36 x 20	600
700	895	840	-	-	-	-	-	-	700
750	-	-	-	-	-	-	-	-	750
800	1.015	950	64	33 x 24	-	-	-	-	800
900	1.115	1.050	67	33 x 28	-	-	-	-	900
1000	1.230	1.160	69	36 x 28	-	-	-	-	1000
1100	-	-	-	-	-	-	-	-	1100
1200	-	-	-	-	-	-	-	-	1200
1300	-	-	-	-	-	-	-	-	1300
1400	-	-	-	-	-	-	-	-	1400
1500	-	-	-	-	-	-	-	-	1500
1600	-	-	-	-	-	-	-	-	1600
1800	-	-	-	-	-	-	-	-	1800
2000	-	-	-	-	-	-	-	-	2000

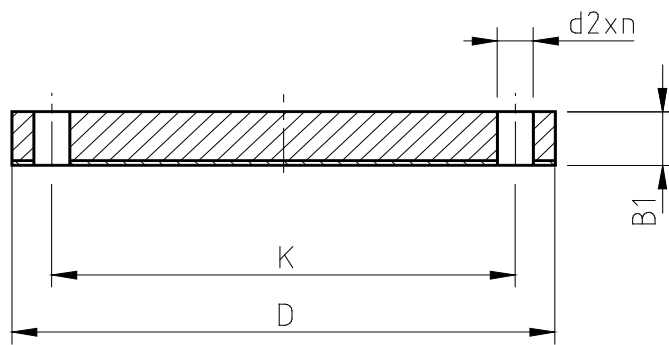
REMARKS:

DN = inside diameter
 B1 = thickness of flange incl. liner
 D = outside diameter flange
 K = diameter bolt circle

d2 = diameter bolt holes
 n = number of bolt holes

¹⁾ also available with 8 holes Ø18

Drilling = according to EN 1092-1 / PN 10 and PN 16



DN (inch)	PN 10 - ANSI 150# DRILLING				PN 16 - ANSI 150# DRILLING				DN (inch)
	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)	D (mm)	K (mm)	B1 (mm)	d2 x n (mm x pc)	
1"	SEE PN 16 150 [#]				108,0	79,4	24	16 x 4	1"
1¼"					117,5	88,9	24	16 x 4	1¼"
1½"					127,0	98,4	25	16 x 4	1½"
2"					152,4	120,6	26	19 x 4	2"
2½"					177,8	139,7	28	19 x 4	2½"
3"					190,5	152,4	28	19 x 4	3"
4"					228,6	190,5	31	19 x 8	4"
5"					254,0	215,9	34	22 x 8	5"
6"					279,4	241,3	36	22 x 8	6"
8"					342,9	298,4	44	22 x 8	8"
10"					406,4	361,9	49	25 x 12	10"
12"					482,6	431,8	52	25 x 12	12"
14"	533,4	476,2	50	28 x 12	533,4	476,2	55	28 x 12	14"
16"	596,9	539,7	52	28 x 16	596,9	539,7	57	28 x 16	16"
18"	635,0	577,8	55	32 x 16	635,0	577,8	61	32 x 16	18"
20"	698,5	635,0	57	32 x 20	698,5	635,0	68	32 x 20	20"
24"	812,6	749,3	60	35 x 20	812,6	749,3	72	35 x 20	24"
28"	927,1	863,6	62	35 x 28	-	-	-	-	28"
30"	984,2	914,4	63	35 x 28	-	-	-	-	30"
32"	1.060,5	977,9	64	41 x 28	-	-	-	-	32"
36"	1.168,4	1.085,8	67	41 x 32	-	-	-	-	36"
40"	1.289,1	1.200,2	69	41 x 36	-	-	-	-	40"

REMARKS:

DN = inside diameter

B1 = thickness of flange incl. liner

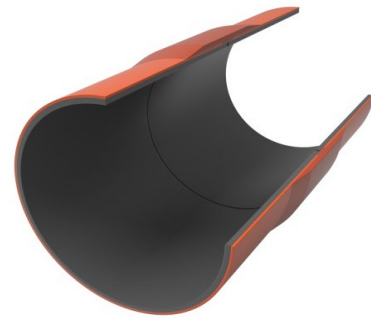
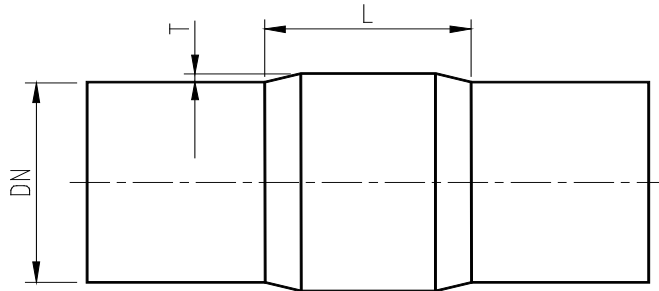
D = outside diameter flange

K = diameter bolt circle

d2 = diameter bolt holes

n = number of bolt holes

Drilling = according to ANSI B16.5 150Lbs



DN (mm)	PN 6		PN 10		PN 16		DN (inch)
	L (mm)	T (mm)	L (mm)	T (mm)	L (mm)	T (mm)	
25	SEE PN 16				100	4	1"
32					100	4	1¼"
40					100	4	1½"
50					110	4	2"
65					120	4	2½"
80					120	4	3"
100					130	4	4"
125					SEE PN 10		120
150	130	4	160	5			6"
200	140	4	190	6			8"
250	140	4	160	5	220	7	10"
300	160	4	180	6	270	9	12"
350	160	4	200	6	300	10	14"
400	180	5	220	7	340	11	16"
450	200	5	250	8	390	13	18"
500	220	6	280	9	420	14	20"
600	260	6	320	11	490	17	24"
700	280	7	360	12	570	20	28"
750	300	8	390	13	600	21	30"
800	320	8	420	14	630	22	32"
900	340	9	460	16	720	25	36"
1000	360	10	500	17	800	28	40"
1100	380	11	550	19	-	-	44"
1200	400	12	600	21	-	-	48"
1300	420	13	640	22	-	-	52"
1400	440	14	690	24	-	-	56"
1500	460	15	740	26	-	-	60"
1600	480	16	780	27	-	-	64"
1800	540	18	880	31	-	-	72"
2000	590	20	970	34	-	-	80"

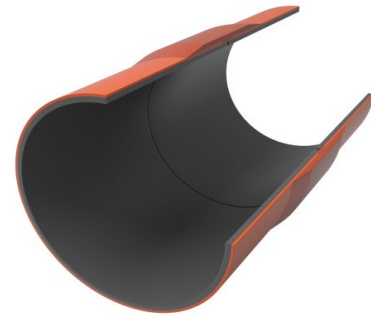
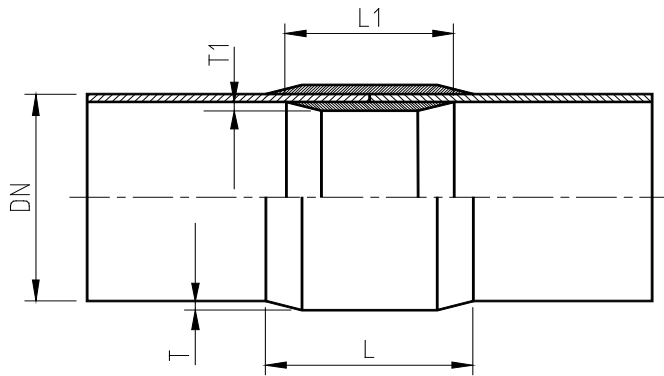
REMARKS:

Type 1 = outside laminate

DN = inside diameter

L = laminare length

T = laminare thickness



DN (mm)	DIMENSIONS OUTSIDE						DIMENSIONS INSIDE						DN (inch)
	PN 6		PN 10		PN 16		PN 6		PN 10		PN 16		
	L (mm)	T (mm)	L (mm)	T (mm)	L (mm)	T (mm)	L ₁ (mm)	T ₁ (mm)	L ₁ (mm)	T ₁ (mm)	L ₁ (mm)	T ₁ (mm)	
600	150	4	220	7	340	11	120	4	140	4	190	6	24"
700	170	5	260	8	390	13	120	4	150	4	210	7	28"
750	170	5	280	9	420	14	120	4	160	5	220	7	30"
800	190	6	290	9	440	15	130	4	170	5	250	8	32"
900	200	6	320	11	490	17	130	4	180	6	270	9	36"
1000	220	7	350	12	550	19	140	4	190	6	300	10	40"
1100	250	8	390	13	-	-	140	4	210	7	-	-	44"
1200	260	8	410	14	-	-	150	4	220	7	-	-	48"
1300	280	9	440	15	-	-	160	5	250	8	-	-	52"
1400	300	10	470	16	-	-	170	5	260	8	-	-	56"
1500	310	10	500	17	-	-	170	5	280	9	-	-	60"
1600	330	11	540	18	-	-	190	6	290	9	-	-	64"
1800	360	12	600	21	-	-	200	6	320	11	-	-	72"
2000	410	14	660	23	-	-	220	7	350	12	-	-	80"

REMARKS:

Type 2 = outside and inside laminate, applicable from DN 600

DN = inside diameter

L = laminates length outside

T = laminates thickness outside

 L₁ = laminates length inside

 T₁ = laminates thickness inside



DN (mm)	EPDM PN 10			EPDM 150 Lbs			DN (inch)
	OD (mm)	ID (mm)	Thickness (mm)	OD (mm)	ID (mm)	Thickness (mm)	
25	70	35	3	64	33	3	1"
32	82	43	3	73	42	3	1¼"
40	92	49	3	83	48	3	1½"
50	107	61	4	102	60	4	2"
65	127	77	4	121	73	4	2½"
80	142	90	4	133	89	4	3"
100	162	115	5	171	115	5	4"
125	192	141	5	193	140	5	5"
150	218	169	6	219	168	6	6"
200	273	220	6	276	219	6	8"
250	328	274	6	337	273	6	10"
300	378	325	6	406	325	6	12"
350	438	368	7	448	356	7	14"
400	490	420	7	512	406	7	16"
450	540	470	7	547	457	7	18"
500	595	520	7	604	508	7	20"
600	695	620	7	715	610	7	24"
700	810	720	8	720	829	8	28"
800	915	820	8	820	937	8	32"
1000	1.120	1.020	8	1.020	1.159	8	40"
1200	1.341	1.220	8	1.220	1.381	8	48"

REMARKS:

DN = inside diameter

OD = outside diameter gasket

ID = inside diameter gasket

gasket materials also available in FPM (Viton), CSM (Hypalon) and CR (Neoprene)

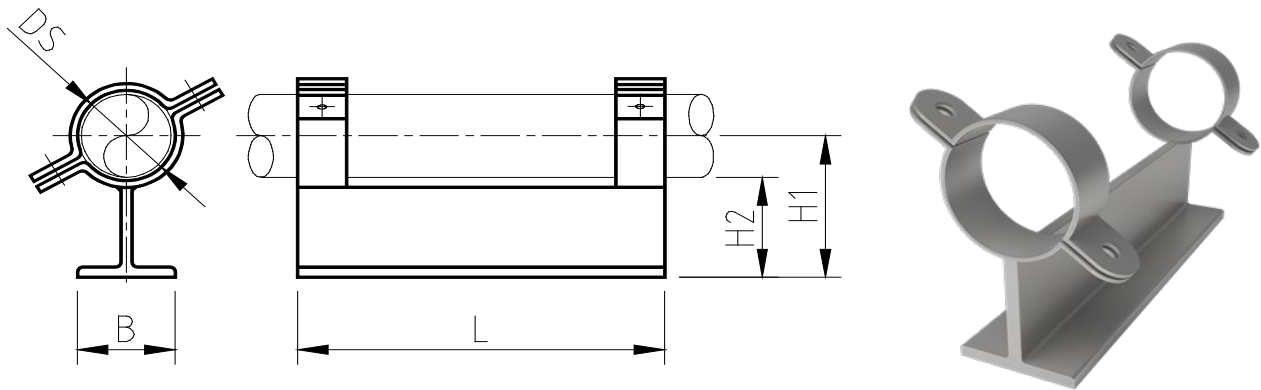


Figure 1

DN (mm)	PIPE SHOE DIMENSIONS for UNINSULATED and INSULATED PIPES										MAX. INSUL. Thickn. (mm)	DN (inch)
	SHOE TYPE	PROFILE TYPE (mm)	CLAMP Ds (mm)	INLAY WxT (mm)	B (mm)	L (mm)	H1 (mm)	H2 (mm)	BOLT Dim. (mm)	SHOE Weight (kg)		
25	Fig. 1	T 60x60x7	38	30x3	60	300	84	64	M10 x 30	2,5	50	1"
32	Fig. 1	T 60x60x7	48	40x3	60	300	89	66	M12 x 40	3,2	50	1¼"
40	Fig. 1	T 60x60x7	54	40x3	60	300	93	66	M12 x 40	3,3	50	1½"
50	Fig. 1	T 80x80x9	63	40x3	80	300	118	86	M12 x 40	4,8	70	2"
65	Fig. 1	T 80x80x9	80	40x3	80	300	126	86	M12 x 40	5,0	70	2½"
80	Fig. 1	T 80x80x9	95	40x3	80	300	133	86	M12 x 40	5,2	70	3"
100	Fig. 1	T 80x80x9	114	40x3	80	300	145	88	M12 x 40	6,1	70	4"
125	Fig. 1	T 100x100x11	140	50x3	100	300	178	108	M16 x 50	9,5	80	5"
150	Fig. 1	T 100x100x11	165	50x3	100	300	190	108	M16 x 50	9,9	80	6"

REMARKS:

DN = inside diameter

Clamp Ds = clamp inside diameter

Inlay WxT = width x thickness of U-profile rubber protection

B = pipe shoe width

L = pipe shoe length

H1 = height to center of pipe

H2 = height to bottom of pipe (without inlay thickness)

Max. Insul. Thickn. = maximum pipe insulation thickness

NOTE:

Standard material = S235JR hot-dip galvanized

Clamp inlay = 3 mm TPE U-profile rubber

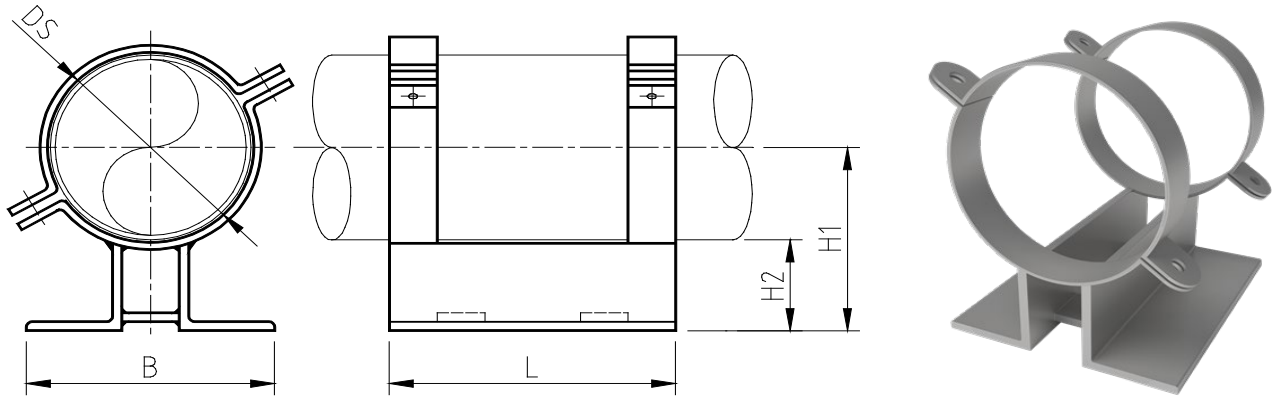


Figure 2

DN (mm)	PIPE SHOE DIMENSIONS for UNINSULATED and INSULATED PIPES										MAX. INSUL. Thickn. (mm)	DN (inch)
	SHOE TYPE	PROFILE TYPE (mm)	CLAMP Ds (mm)	INLAY WxT (mm)	B (mm)	L (mm)	H1 (mm)	H2 (mm)	BOLT Dim. (mm)	SHOE Weight (kg)		
200	Fig. 2	L 100x100x10	216	50x3	260	300	208	101	M16 x 50	15,6	80	8"
250	Fig. 2	L 100x100x10	267	60x3	260	300	234	101	M20 x 60	18,6	80	10"
300	Fig. 2	L 100x100x10	318	60x3	260	300	260	101	M20 x 60	19,8	80	12"
350	Fig. 2	L 100x100x10	368	60x3	260	300	286	102	M20 x 60	21,7	80	14"
400	Fig. 2	L 120x120x10	420	70x3	430	300	313	103	M24 x 80	30,8	80	16"
450	Fig. 2	L 120x120x10	480	70x3	460	300	339	104	M24 x 80	33,9	80	18"
500	Fig. 2	L 150x150x12	520	70x3	460	300	403	142	M24 x 80	42,3	120	20"
600	Fig. 2	L 150x150x12	620	70x3	460	400	455	142	M24 x 80	53,0	120	24"

REMARKS:

DN = inside diameter

Clamp Ds = clamp inside diameter

Inlay WxT = width x thickness of U-profile rubber protection

B = pipe shoe width

L = pipe shoe length

H1 = height to center of pipe

H2 = height to bottom of pipe (without inlay thickness)

Max. Insul. Thickn. = maximum pipe insulation thickness

NOTE:

Standard material = S235JR hot-dip galvanized

Clamp inlay = 3 mm TPE U-profile rubber

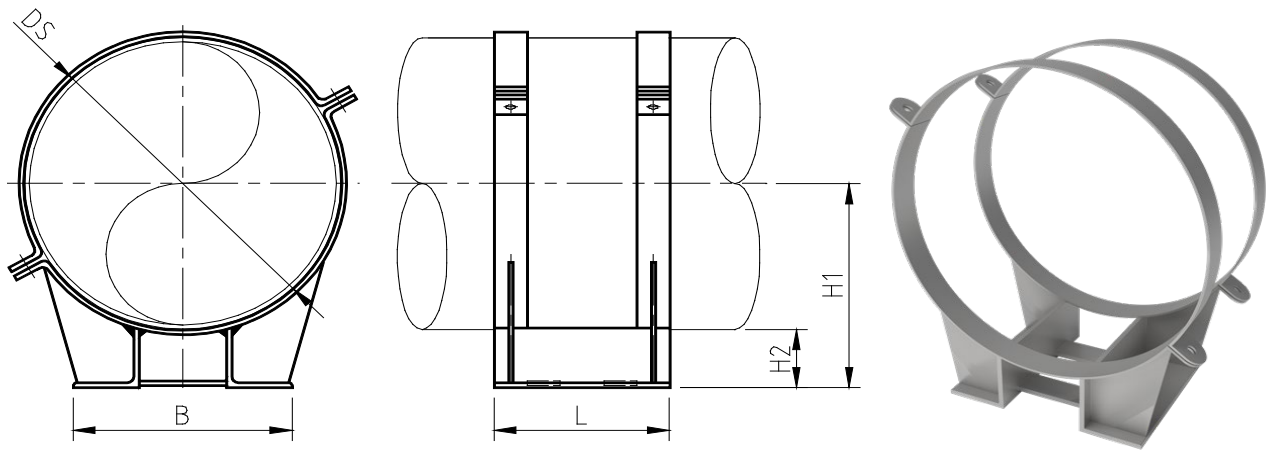


Figure 3

DN (mm)	PIPE SHOE DIMENSIONS for UNINSULATED and INSULATED PIPES (PN 10)										MAX. INSUL. Thickn. (mm)	DN (inch)
	SHOE TYPE	PROFILE TYPE (mm)	CLAMP Ds (mm)	INLAY WxT (mm)	B (mm)	L (mm)	H1 (mm)	H2 (mm)	BOLT Dim. (mm)	SHOE Weight (kg)		
700	Fig. 3	L 150x150x12	725	70x3	500	400	504	143	M24 x 80	80,9	120	28"
750	Fig. 3	L 150x150x12	780	70x3	500	400	532	147	M24 x 80	85,2	120	30"
800	Fig. 3	L 150x150x12	830	70x3	500	400	558	147	M24 x 80	87,8	120	32"
900	Fig. 3	L 180x180x16	935	75x3	630	500	637	175	M24 x 80	127,7	140	36"
1000	Fig. 3	L 180x180x16	1032	75x3	630	500	688	175	M24 x 80	132,7	140	40"
1100	Fig. 3	L 180x180x16	1125	75x3	650	600	730	166	M24 x 80	177,2	140	44"
1200	Fig. 3	L 180x180x16	1230	75x3	650	600	784	170	M24 x 80	191,2	140	48"
1300	Fig. 3	L 180x180x16	1330	75x3	650	600	835	170	M24 x 80	199,8	140	52"
1400	Fig. 3	L 180x180x16	1430	75x3	650	600	886	171	M24 x 80	208,9	140	56"
1500	Fig. 3	L 180x180x16	1535	75x3	750	600	935	168	M24 x 80	232,4	140	60"
1600	Fig. 3	L 180x180x16	1635	75x3	750	700	986	168	M24 x 80	251,2	140	64"
1800	Fig. 3	L 180x180x16	1840	75x3	780	700	1087	167	M24 x 80	270,4	140	72"
2000	Fig. 3	L 180x180x16	2040	75x3	780	700	1189	168	M24 x 80	289,5	140	80"

REMARKS:

DN = inside diameter

Clamp Ds = clamp inside diameter

Inlay WxT = width x thickness of U-profile rubber protection

B = pipe shoe width

L = pipe shoe length

H1 = height to center of pipe

H2 = height to bottom of pipe (without inlay thickness)

Max. Insul. Thickn. = maximum pipe insulation thickness

NOTE:

Standard material = S235JR hot-dip galvanized

Clamp inlay = 3 mm TPE U-profile rubber

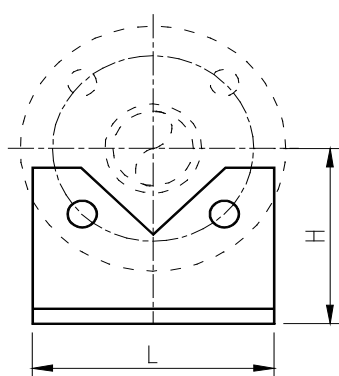


Figure 4

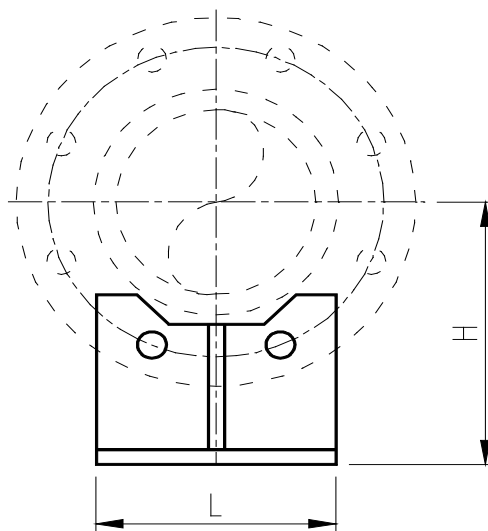
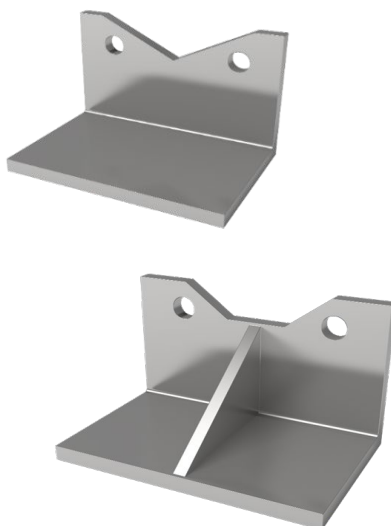


Figure 5

DN (mm)	FLANGE SUPPORT DIMENSIONS for UNINSULATED and INSULATED PIPES								DN (inch)
	SUPPORT TYPE	DRILLING PN 10		DRILLING PN 16		DRILLING 150 [#]		SUPPORT Weight (kg)	
		L (mm)	H (mm)	L (mm)	H (mm)	L (mm)	H (mm)		
25	Figure 4	SEE PN 16		100	84	110	84	0,9	1"
32	Figure 4			130	89	120	89	1,5	1¼"
40	Figure 4			140	93	120	93	1,6	1½"
50	Figure 4			150	118	150	118	2,3	2"
65	Figure 4			160	126	160	126	2,4	2½"
80	Figure 5	SEE PN 16		100	133	170	133	2,6	3"
100	Figure 5			110	145	120	145	1,8	4"
125	Figure 5			130	178	150	178	2,7	5"
150	Figure 5			160	190	160	190	2,8	6"
200	Figure 5			180	208	140	208	180	208

REMARKS:

DN = inside diameter
 L = profile length
 H = height to center of pipe

NOTE:

Standard material = S235JR hot-dip galvanized
 Deliveries may deviate from images

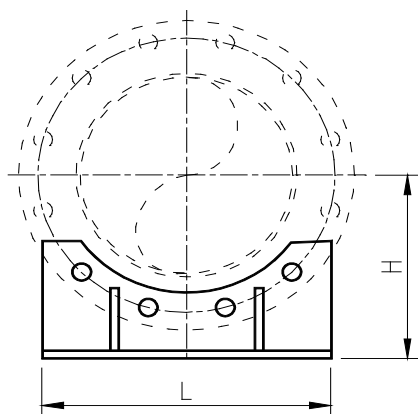


Figure 6

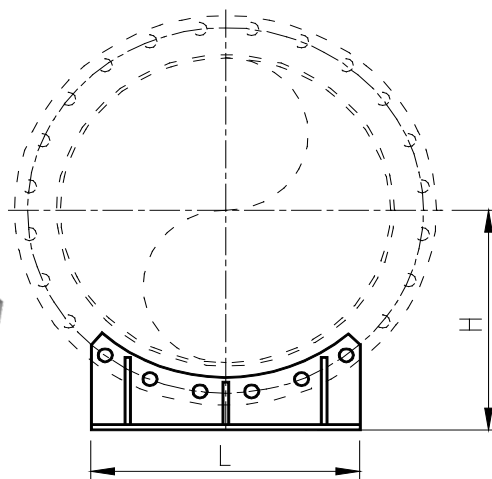
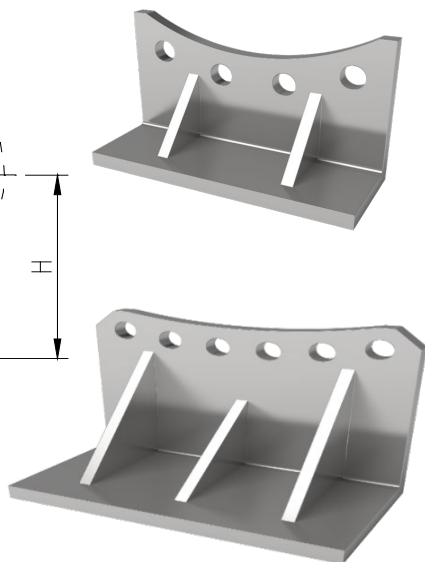


Figure 7

DN (mm)	FLANGE SUPPORT DIMENSIONS for UNINSULATED and INSULATED PIPES								DN (inch)
	SUPPORT TYPE	DRILLING PN 10		DRILLING PN 16		DRILLING 150 [#]		SUPPORT Weight (kg)	
		L (mm)	H (mm)	L (mm)	H (mm)	L (mm)	H (mm)		
250	Figure 6	300	234	310	234	320	234	7,4	10"
300	Figure 6	340	260	350	260	370	260	9,2	12"
350	Figure 6	310	286	320	286	400	286	10,4	14"
400	Figure 6	350	313	360	313	370	313	8,9	16"
450	Figure 6	320	339	340	339	390	339	10,0	18"
500	Figure 6	340	403	370	403	360	403	12,9	20"
600	Figure 6	400	455	430	455	420	455	14,8	24"
700	Figure 7	610	504	630	504	570	504	15,8	28"
750	Figure 7					600	532	17,1	30"
800	Figure 7	680	558	670	558	610	558	19,4	32"
900	Figure 7	660	637	650	637	600	637	29,4	36"
1000	Figure 7	730	688	720	688	600	688	28,1	40"

REMARKS:

DN = inside diameter
 L = profile length
 H = height to center of pipe

NOTE:

Standard material = S235JR hot-dip galvanized
 Deliveries may deviate from images

HYDROSTATIC PROPERTIES				
DESCRIPTION	SYMB.	VALUE	UNIT	TEST METHOD
Short Term Tensile Strength, biaxial, hoop	σ_{tr}	282	N/mm ²	ASTM D 1599
Short Tensile Strength, biaxial, axial	σ_{ta}	141	N/mm ²	ASTM D 1599
Long Term Hydrostatic Design Basis	σ_{LTHS}	129	MPa	ASTM D 2992-B
97,5% Lower Confidence Limit	HDB, LCL, σ_{qs}	110	MPa	ASTM D 2992-B
Regression Gradient	$G_{default}$	0,059	-	ASTM D 2992-B
Hydrostatic Design Stress at NPR	HDS, σ_{npr}	62	MPa	ISO 14692
based on:	f_2	0,67	-	
	f_{2test}	0,89	-	
	f_3	0,845	-	

DESCRIPTION	SYMB.	VALUE	UNIT	TEST METHOD
LCL Lower Confidence Limit or Qualified Stress	σ_{qs}	110	Mpa	ASTM D 2992-B
Short Term Hoop Strength at 2:1 Stress Ratio	$\sigma_{sh(2:1)}$	240	Mpa	ASTM D 1599
Scaling Factor	f_{scale}	0,46	-	
Short Term Axial Strength at 0:1 Stress Ratio	$\sigma_{sa(0:1)}$	80	Mpa	ASTM D 2105
Short Term Axial Strength at 2:1 Stress Ratio	$\sigma_{sa(2:1)}$	120	Mpa	ASTM D 1599

MECHANICAL PROPERTIES				
DESCRIPTION	SYMB.	VALUE	UNIT	TEST METHOD
Hoop Bending Stress	σ_{bh}	120	N/mm ²	ASTM D 2412
Hoop Bending Modulus	E_{bh}	25.000	N/mm ²	ASTM D 2412
Axial Bending Stress	σ_{ba}	80	N/mm ²	
Axial Bending Modulus	E_{ba}	12.500	N/mm ²	ASTM D 2925
Hoop Tensile Stress	σ_{th}	240	N/mm ²	ASTM D 2290
Hoop Tensile Modulus	E_{th}	22.000	N/mm ²	ASTM D 2290
Short Term Axial Tensile Stress	σ_{ta}	80	N/mm ²	ASTM D 2105
Axial Tensile Modulus	E_{ta}	12.000	N/mm ²	ASTM D 2105
Shear Modulus	G	11.000	N/mm ²	
Equivalent Ring Flexural Modulus of Elasticity	E_{hf}	28.000	N/mm ²	
Poissons Ratio Axial Load/Hoop Contraction	ρ_{gvk}	0,3	-	ASTM D 2105 (mod)
Poissons Ratio Hoop Load/Axial Contraction	ν_{xh}	0,55	-	
Barcol Hardness	ν_{xh}	40	-	ASTM D 2583

PHYSICAL PROPERTIES				
DESCRIPTION	SYMB.	VALUE	UNIT	TEST METHOD
Expansion Coefficient, axial	σ_r	$18 \cdot 10^{-6}$	1/°C	ASTM D 696
Density	ρ_{gvk}	1,9	kg/dm ³	ASTM D 792
K-Value	k	0,01	mm	
Heat Conductivity	λ	0,26	W/mK	ASTM C 177