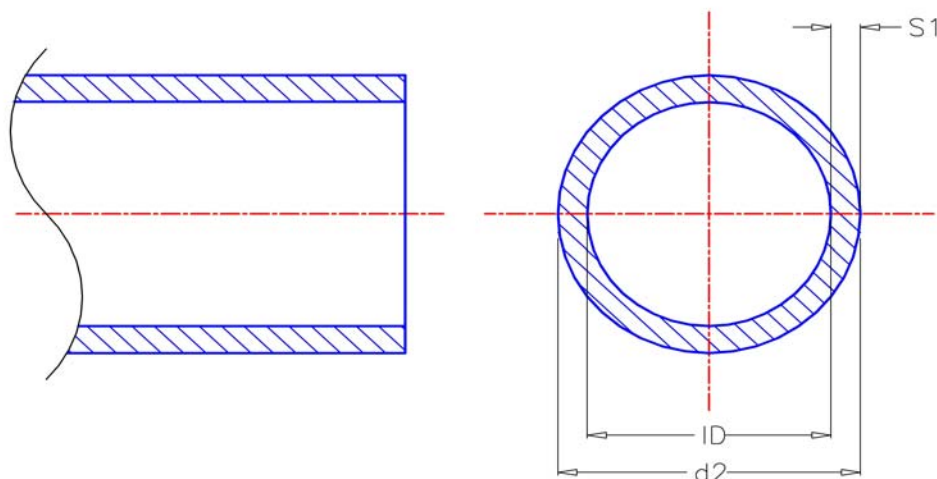


LINER PIPE
Inside Diameter
Liner Thickness



DN - Nominal diameter

S₁ - Liner wall thickness

d₂ - Outside diameter of liner

Liner material density for PVC: 1.38g/cm³

Liner material density for PVC-C: 1.5g/cm³

Liner material density for PPH & PPH2222: 0.91g/cm³

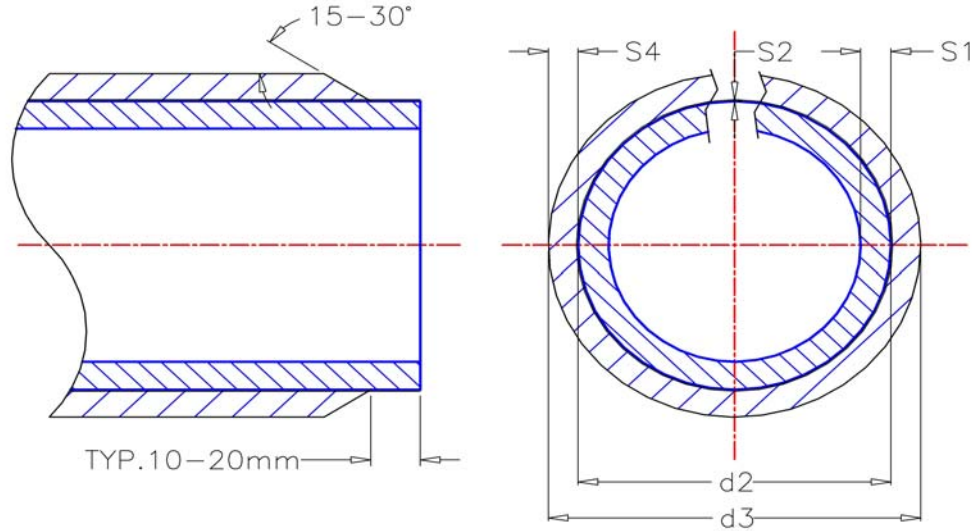
Liner material density for PVDF: 1.79g/cm³

Liner material density for ECTFE: 1.82g/cm³

DN		LINER PIPE													
		PVC-U		PVC-EN		PVC-C		PPH & PPH2222		PVDF		ECTFE			
in	mm	d ₂	S ₁	ID	S ₁	ID	S ₁	ID	S ₁	ID	S ₁	ID	S ₁	ID	
1"	25	32	2.8	26.4	3.6	24.8	3.6	24.8	2.9	26.2	2.4	27.2	2.4	27.2	
1-1/2"	40	50	3.0	44.0	3.7	42.6	3.7	42.6	4.6	40.8	3.0	44.0	3.0	44.0	
2"	50	63	3.7	55.6	4.7	53.6	4.7	53.6	3.6	55.8	3.0	57.0	3.0	57.0	
3"	80	90	3.6	82.8	4.3	81.4	4.3	81.4	3.5	83.0	2.8	84.4	2.8	84.4	
4"	100	110	5.3	99.4	5.3	99.4	5.3	99.4	4.2	101.6	3.0	104.0	3.0	104.0	
6"	150	160	4.9	150.2	4.7	150.6	4.7	150.6	4.9	150.2	3.0	154.0	3.0	154.0	
8"	200	200	6.2	187.6	4.0	192.0	4.0	192.0	4.9	190.2	3.0	194.0	2.3	195.4	
10"	250	250	7.7	234.6	4.9	240.2	4.9	240.2	6.2	237.6	3.0	244.0	2.3	245.4	
12"	300	315	9.7	295.6	4.5	306.0	4.5	306.0	7.7	299.6	4.0	307.0	2.3	310.4	
14"	350	355	4.0	347.0	4.5	346.0	4.5	346.0	8.7	337.6	4.0	347.0	2.3	350.4	
16"	400	400	4.0	392.0	5.0	390.0	5.0	390.0	9.8	380.4	3.0	394.0	2.3	395.4	
18"	450	450	4.0	442.0	5.0	440.0	5.0	440.0	6.0	438.0	3.0	444.0	2.3	445.4	
20"	500	500	4.0	492.0	5.0	490.0	5.0	490.0	8.0	484.0	3.0	494.0	2.3	495.4	
24"	600	600	4.0	592.0	5.0	590.0	5.0	590.0	10.0	580.0	3.0	594.0	2.3	595.4	
28"	700	710	4.0	702.0	4.0	702.0	4.0	702.0	4.0	702.0	3.0	704.0	2.3	705.4	
32"	800	800	4.0	792.0	4.0	792.0	4.0	792.0	4.0	792.0	3.0	794.0	2.3	795.4	
36"	900	900	4.0	892.0	4.0	892.0	4.0	892.0	4.0	892.0	3.0	894.0	2.3	895.4	
40"	1000	1000	4.0	992.0	4.0	992.0	4.0	992.0	4.0	992.0	3.0	994.0	2.3	995.4	

LAMINATED PIPE

Structural part is based on premium grade epoxy vinylester resin.
Design in compliance to DIN 16 965 part 2 TypeB



S₂ - Bonding layer thk. (max.1mm)

S₃ - Structure laminate thk.

S₃ = S₄ · S₂

S₄ = S₃ ÷ S₂

d₃ - Pipe outside diameter

Mass of glass content S₃ : 60% ± 5%

PN- Nominal pressure (bar)

Material density of FRP is 1.9g/cm³

For S₁ thickness refer to Liner Pipe Section

- 1 Values have been determined in accordance with DIN7151, IT 16 and rounded to the nearest 0.1mm

DN		PN 6					PN 10					PN 16				
in	mm	d ₂	S ₄	Dev. ¹	d ₃	Weight (kg/m)	S ₄	Dev. ¹	d ₃	Weight (kg/m)	S ₄	Dev. ¹	d ₃	Weight (kg/m)		
1"	25	32	2.9	+0,6 0	37.8	1.2	2.9	+0,6 0	37.8	1.2	2.9	+0,6 0	37.8	1.2		
1-1/2"	40	50	2.9	+0,6 0	55.8	1.8	2.9	+0,6 0	55.8	1.8	2.9	+0,6 0	55.8	1.8		
2"	50	63	2.9	+0,6 0	68.8	2.3	2.9	+0,6 0	68.8	2.3	2.9	+0,6 0	68.8	2.3		
3"	80	90	2.9	+0,6 0	95.8	3.4	2.9	+0,6 0	95.8	3.4	2.9	+0,6 0	95.8	3.4		
4"	100	110	2.9	+0,6 0	115.8	4.2	2.9	+0,6 0	115.8	4.2	2.9	+0,6 0	115.8	4.2		
6"	150	160	2.9	+0,6 0	165.8	6.2	2.9	+0,6 0	165.8	6.2	3.2	+0,7 0	166.4	6.6		
8"	200	200	2.9	+0,6 0	205.8	7.7	2.9	+0,6 0	205.8	7.7	3.7	+0,7 0	207.4	8.9		
10"	250	250	2.9	+0,6 0	255.8	8.6	3.1	+0,7 0	256.2	11.1	4.4	+0,7 0	258.8	11.9		
12"	300	315	2.9	+0,6 0	320.8	10.3	3.7	+0,7 0	322.4	13.4	5.3	+0,7 0	325.6	16.0		
14"	350	355	2.9	+0,6 0	360.8	12.2	4.0	+0,7 0	363.0	16.8	5.8	+0,7 0	366.6	19.9		
16"	400	400	3.1	+0,7 0	406.2	14.9	4.4	+0,7 0	408.8	20.1	6.4	+0,9 0	412.8	27.0		
18"	450	450	3.6	+0,7 0	457.2	16.0	5.2	+0,7 0	460.4	23.0	7.8	+0,9 0	465.6	34.0		
20"	500	500	3.6	+0,7 0	507.2	20.1	5.2	+0,7 0	510.4	26.6	7.8	+0,9 0	515.6	38.1		
24"	600	600	4.1	+0,7 0	608.2	25.9	6.1	+0,9 0	612.2	35.4	9.1	+1,1 0	618.2	43.3		
28"	700	710	4.6	+0,7 0	709.2	32.6	7.0	+0,9 0	714.0	43.9	10.6	+1,1 0	721.2	57.3		
32"	800	800	5.1	+0,7 0	810.2	39.0	7.7	+0,9 0	815.4	50.6	11.8	+1,1 0	823.6	69.1		
36"	900	900	5.6	+0,7 0	911.2	46.5	8.6	+0,9 0	917.2	60.1	13.2	+1,1 0	926.4	85.5		
40"	1000	1000	6.1	+0,9 0	1012.2	53.9	9.4	+0,9 0	1018.8	71.0	14.5	+1,1 0	1029.0	99.9		

Designation example for type B glass fiber reinforced vinylester resin pipe, nominal size DN250, for nominal pressure PN6 and with CPVC liner : **DIN16965-B250-6CPVC**

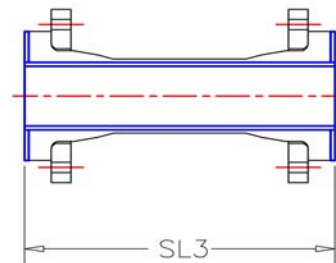
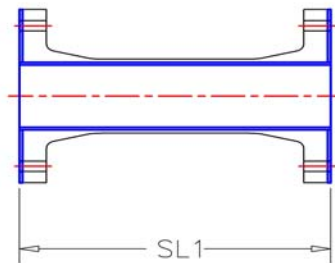
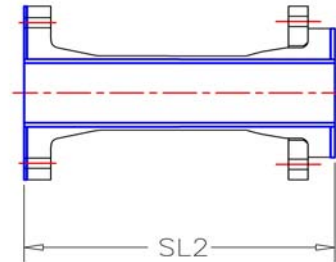
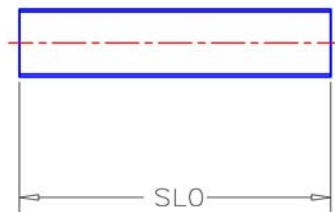


PIPE LENGTHS

Structural part is based on premium grade epoxy vinylester resin.

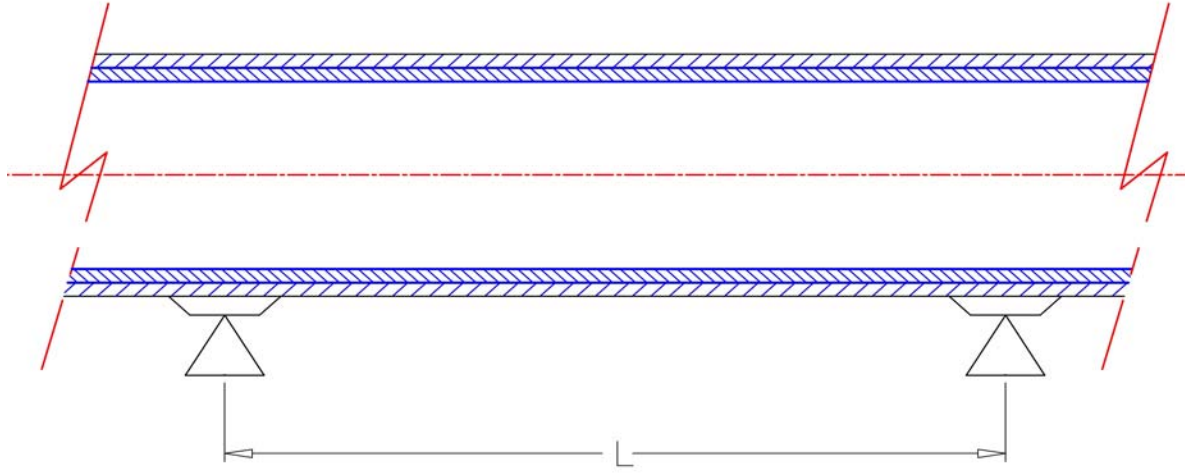
Standard Pipe Length Dimension SL0

- PVC-U: 6.0 m
- PVC-EN: 6.2 m
- PVC-C: 5.0 m
- PPH: 6.2 m
- PVDF: 5.0 m
- ECTFE: 5.0 m



DN		Minimum Spool Lengths			
in	mm	SL1	SL2	SL3	
		mm	mm	mm	mm
1"	25	220	220	220	220
1-1/2"	40	220	220	220	220
2"	50	230	230	230	230
3"	80	240	240	240	240
4"	100	250	250	250	250
6"	150	270	270	270	270
8"	200	280	280	280	280
10"	250	320	300		280
12"	300	360	330		300
14"	350	340	330		320
16"	400	360	350		340
18"	450	400	380		360
20"	500	400	380		360
24"	600	440	400		360
28"	700	440	405		370
32"	800	460	415		370
36"	900	480	425		370
40"	1000	520	445		370

PIPE SUPPORT SPAN

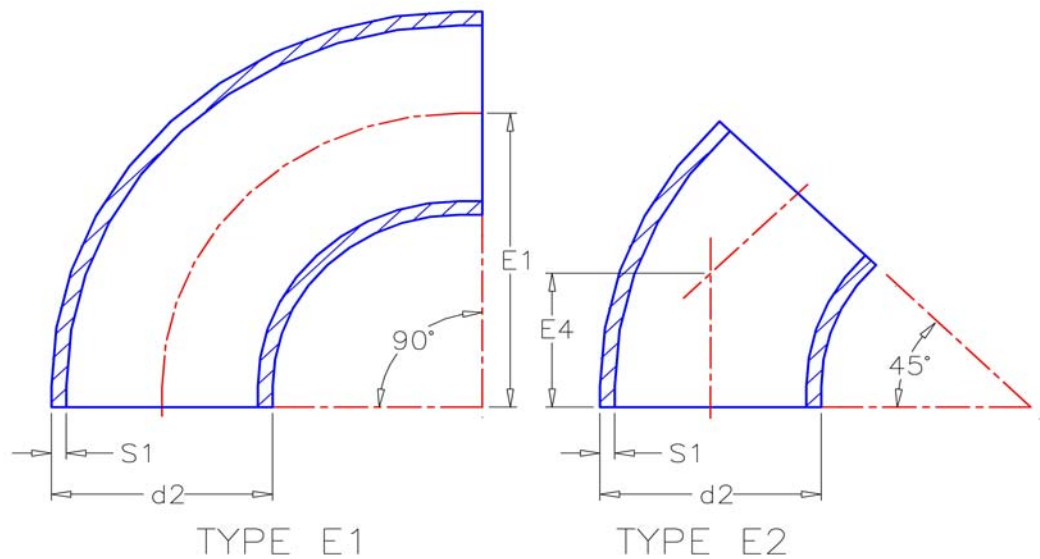


ρ - Fluid density
 T - Temperature application
 Design temperature is 50°C
 Wind loads and seismic are not taking into account
 For 20" Ø and greater contact ACP

Maximum allowable support spacing L in meters for pipe type B according to DIN16965 part2; without insulation

DN		PN 6				PN 10				PN 16				PN 16
in	mm	Gas	Liquids			Gas	Liquids			Gas	Liquids			Lined Steel Comparison
		ρ=0	ρ=1	ρ=1.5	ρ=1.8	ρ=0	ρ=1	ρ=1.5	ρ=1.8	ρ=0	ρ=1	ρ=1.5	ρ=1.8	ρ=1
1"	25	2.3	2.1	2	2.0	2.3	2.1	2	2.0	2.3	2.1	2	2.0	2.1
1-1/2"	40	2.8	2.4	2.3	2.2	2.8	2.4	2.3	2.2	2.8	2.4	2.3	2.2	2.7
2"	50	3.1	2.6	2.4	2.4	3.1	2.6	2.4	2.4	3.1	2.6	2.4	2.4	3.0
3"	80	3.6	2.9	2.7	2.6	3.6	2.9	2.7	2.6	3.6	2.9	2.7	2.6	3.7
4"	100	4.0	3.0	2.8	2.7	4.0	3.0	2.8	2.7	4.0	3.0	2.8	2.7	4.3
6"	150	4.8	3.4	3.1	3.0	4.8	3.4	3.1	3.0	4.9	3.5	3.2	3.1	5.2
8"	200	5.3	3.6	3.3	3.2	5.3	3.6	3.3	3.2	5.7	3.9	3.6	3.5	5.8
10"	250	5.9	3.8	3.5	3.4	6.1	3.9	3.6	3.4	6.6	4.4	4	3.9	6.7
12"	300	6.5	4.0	3.7	3.5	6.9	4.4	4	3.8	7.4	4.9	4.5	4.3	7.0
14"	350	7.1	4.2	3.9	3.7	7.6	4.7	4.3	4.1	8.2	5.2	4.8	4.6	7.6
16"	400	7.5	4.4	4	3.8	8.3	5.0	4.5	4.4	8.8	5.6	5.1	4.9	8.2
20"	500	8.9	5.1	4.7	4.5	9.5	5.6	5.1	4.9	10.0	6.2	5.7	5.5	9.1
Nom. Pressure		Operating pressure gauge to DIN 16867:Pipe												
		- 20°C to + 50°C						+ 51°C to + 80°C						
PN 16		A				PN 16				B				PN 10
PN 10						PN 10								PN 6
PN 6						PN 6								PN 4
Application range -A- to DIN 16867 T<50°C														

45° & 90° ELBOWS



For Material density see Liner Pipe

- ¹ Elbows are injection molded or mitered up to 8in, 10in and up are mitered
- ² Elbows are injection molded or mitered up to 6in, 8in and up are mitered

Type E1 : 90° Elbow

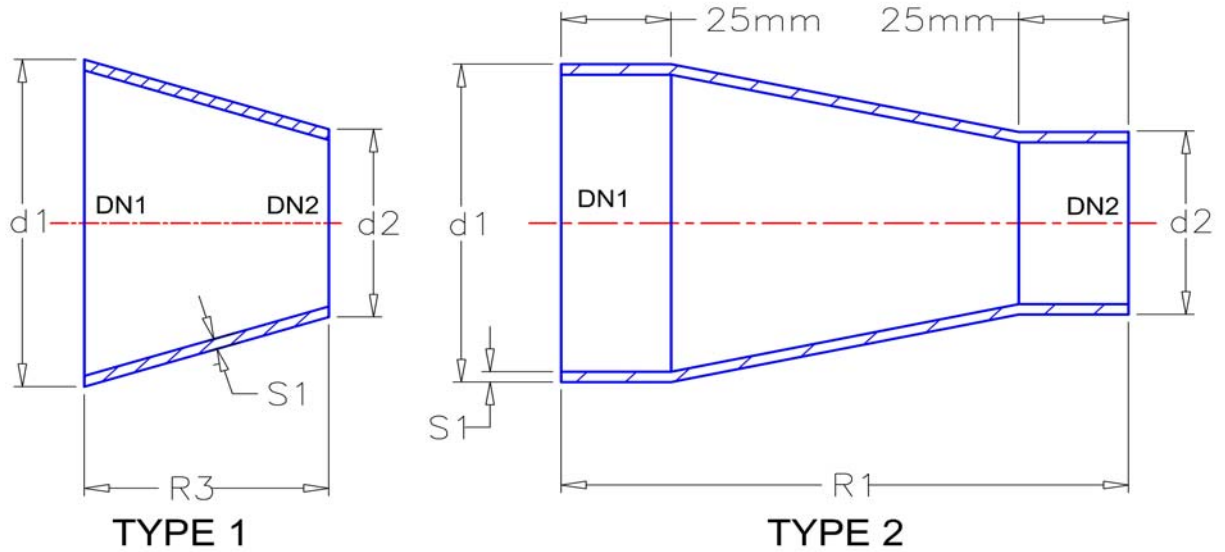
Type E2 : 45° Elbow

Unlaminated fittings are prepared with knitted glass bonding layer except PVC-U, -EN, -C (Grinded surface only)

DN		C to F		S ₁						
in	mm	E1	E4	d ₂	PVC-U ¹	PVC-EN ¹	PVC-C ¹	PPH&PPH2222 ¹	PVDF ²	ECTFE ²
1"	25	38	18	32	3.5	3.5	3.5	3.5	2.4	2.4
1-1/2"	40	58	24	50	4.6	4.6	4.6	4.6	3.0	3.0
2"	50	70	29	63	4.0	4.0	4.0	4.0	3.0	3.0
3"	80	100	41	90	4.0	4.0	4.0	4.0	2.8	2.8
4"	100	120	50	110	4.5	4.5	4.5	4.5	3.4	3.4
6"	150	170	70	160	6.0	6.0	6.0	6.0	3.0	3.0
8"	200	200	107	200	4.5	6.5	6.5	4.5	3.0	2.3
10"	250	250	125	250	7.7	4.9	4.9	6.2	3.0	2.3
12"	300	315	157	315	9.7	4.5	4.5	7.7	4.0	2.3
14"	350	355	177	355	4.0	4.5	4.5	8.7	4.0	2.3
16"	400	400	200	400	4.0	5.0	5.0	9.8	3.0	2.3
18"	450	450	225	450	4.0	5.0	5.0	8.0	3.0	2.3
20"	500	500	250	500	4.0	5.0	5.0	4.0	3.0	2.3
24"	600	600	300	600	4.0	5.0	5.0	4.0	3.0	2.3
28"	710	710	355	710	4.0	4.0	4.0	4.0	3.0	2.3
32"	800	800	400	800	4.0	4.0	4.0	4.0	3.0	2.3
36"	900	900	450	900	4.0	4.0	4.0	4.0	3.0	2.3
40"	1000	1000	500	1000	4.0	4.0	4.0	4.0	3.0	2.3

Designation of a 90° elbow E1 corresponding to type B pipes of nominal size DN80 and for a nominal pressure PN6, with type L laminated ends and a PVDF lining: **Elbow DIN16966-E1B80-6L-PVDF**

CONCENTRIC REDUCER



For Type 2 S₁ see Elbow S₁

L₁: Reducer length

Type 1 - is a thermo formed reducer

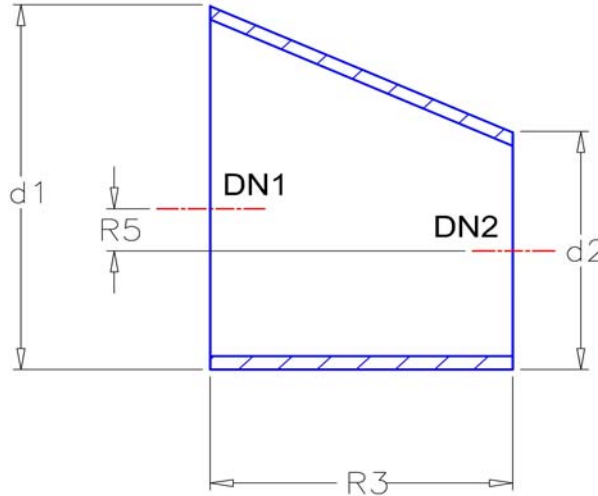
Type 2 - is a injection molded reducer (up to 6"Ø)

Unlaminated fittings are prepared with knitted glass bonding layer except PVC-U, -EN, -C (Grinded surface only)

Type 1 reducer available in other sizes, to find the dimension use R3=2.5 x (DN1-DN2)

DN1		DN2		d ₁	d ₂	R1	R3	S ₁					
in	mm	in	mm	mm	mm	mm	mm	PVC-U	PVC-EN	PVC-C	PPH&PPH2222	PVDF	ECTFE
1-1/2"	40	1"	25	50	32	95	45	4.0	4.0	4.0	4.0	3.0	2.3
2"	50	1-1/2"	40	63	50	58	33	4.0	4.0	4.0	4.0	3.0	2.3
		1"	25		32	128	78	4.0	4.0	4.0	4.0	3.0	2.3
3"	80	1"	25	90	32	195	145	4.0	4.0	4.0	4.0	3.0	2.3
		1-1/2"	40		50	125	100	4.0	4.0	4.0	4.0	3.0	2.3
		2"	50		63	93	68	4.0	4.0	4.0	4.0	3.0	2.3
4"	100	2"	50	110	63	168	118	4.0	4.0	4.0	4.0	3.0	2.3
		3"	80		90	75	50	4.0	4.0	4.0	4.0	3.0	2.3
6"	150	3"	80	160	90	225	175	5.0	5.0	5.0	5.0	3.0	2.3
		4"	100		110	150	125	5.0	5.0	5.0	5.0	3.0	2.3
8"	200	3"	80	200	90	NA	275	4.0	4.0	4.0	4.0	3.0	2.3
		4"	100		110	N/A	225	4.0	4.0	4.0	4.0	3.0	2.3
		6"	150		160	N/A	100	4.0	4.0	4.0	4.0	3.0	2.3
10"	250	4"	100	250	110	NA	350	4.0	4.0	4.0	4.0	3.0	2.3
		6"	150		160	N/A	225	4.0	4.0	4.0	4.0	3.0	2.3
		8"	200		200	N/A	125	4.0	4.0	4.0	4.0	3.0	2.3
12"	300	6"	150	315	160	N/A	388	4.0	4.0	4.0	4.0	3.0	2.3
		8"	200		200	N/A	288	4.0	4.0	4.0	4.0	3.0	2.3
		10"	250		250	N/A	163	4.0	4.0	4.0	4.0	3.0	2.3
14"	350	8"	200	355	200	N/A	388	4.0	4.0	4.0	4.0	3.0	2.3
		10"	250		250	N/A	263	4.0	4.0	4.0	4.0	3.0	2.3
		12"	300		315	N/A	100	4.0	4.0	4.0	4.0	3.0	2.3
16"	400	10"	250	400	250	N/A	375	4.0	4.0	4.0	4.0	3.0	2.3
		12"	300		315	N/A	213	4.0	4.0	4.0	4.0	3.0	2.3
		14"	350		355	N/A	113	4.0	4.0	4.0	4.0	3.0	2.3

ECCENTRIC REDUCER



Unlaminated fittings are prepared with knitted glass bonding layer except PVC-U, -EN, -C (Grinded surface only)

EC Reducer type - is a injection molded or thermoformed reducer up to 4"Ø, 6"Ø and above is thermoformed

Eccentric reducer available in other sizes, to find the dimension use $R5 = (DN1 - DN2) \div 2$

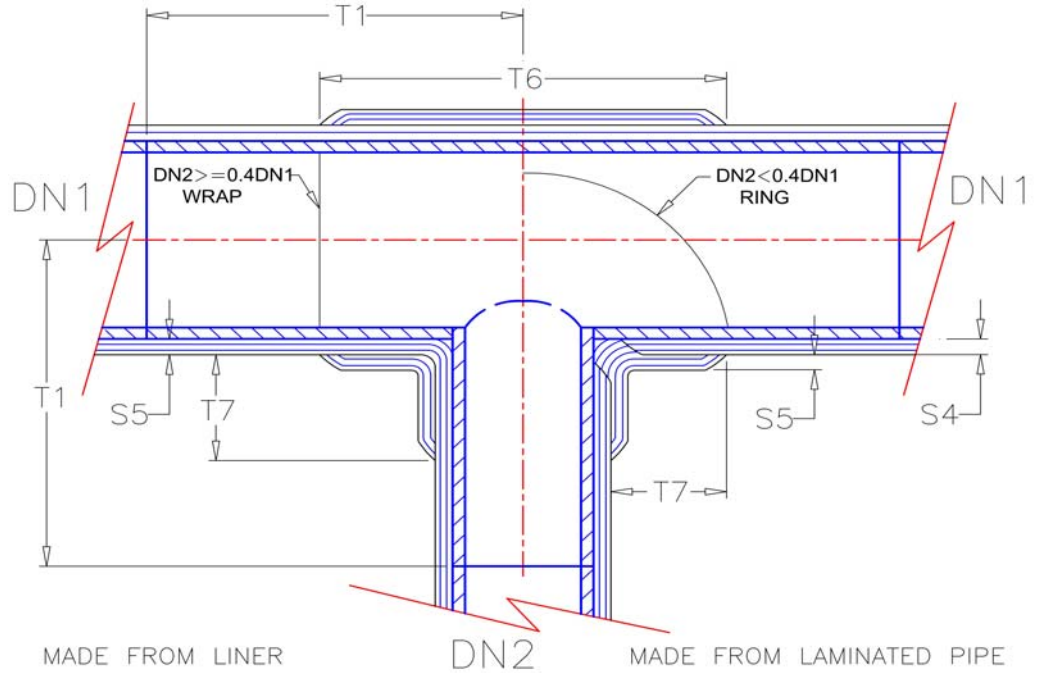
DN1		DN2		d ₁	d ₂	R3	R5	S ₁					
in	mm	in	mm	mm	mm	mm	mm	PVC-U	PVC-EN	PVC-C	PPH & PPH2222	PVDF	ECTFE
1-1/2"	40	1"	25	50	32	45	9	4.0	4.0	4.0	4.0	3.0	2.3
2"	50	1-1/2"	40	63	50	33	7	4.0	4.0	4.0	4.0	3.0	2.3
		1"	25		32	78	16	4.0	4.0	4.0	4.0	3.0	2.3
3"	80	1"	25	90	32	145	29	4.0	4.0	4.0	4.0	3.0	2.3
		1-1/2"	40		50	100	20	4.0	4.0	4.0	4.0	3.0	2.3
		2"	50		63	68	14	4.0	4.0	4.0	4.0	3.0	2.3
4"	100	2"	50	110	63	118	24	4.0	4.0	4.0	4.0	3.0	2.3
		3"	80		90	50	10	4.0	4.0	4.0	4.0	3.0	2.3
6"	150	3"	80	160	90	175	35	4.0	4.0	4.0	4.0	3.0	2.3
		4"	100		110	125	25	4.0	4.0	4.0	4.0	3.0	2.3
8"	200	3"	80	200	90	275	55	4.0	4.0	4.0	4.0	3.0	2.3
		4"	100		110	225	45	4.0	4.0	4.0	4.0	3.0	2.3
		6"	150		160	100	20	4.0	4.0	4.0	4.0	3.0	2.3
10"	250	4"	100	250	110	350	70	4.0	4.0	4.0	4.0	3.0	2.3
		6"	150		160	225	45	4.0	4.0	4.0	4.0	3.0	2.3
		8"	200		200	125	25	4.0	4.0	4.0	4.0	3.0	2.3
12"	300	6"	150	315	160	388	78	4.0	4.0	4.0	4.0	3.0	2.3
		8"	200		200	288	58	4.0	4.0	4.0	4.0	3.0	2.3
		10"	250		250	163	33	4.0	4.0	4.0	4.0	3.0	2.3
14"	350	8"	200	355	200	388	78	4.0	4.0	4.0	4.0	3.0	2.3
		10"	250		250	263	53	4.0	4.0	4.0	4.0	3.0	2.3
		12"	300		315	100	20	4.0	4.0	4.0	4.0	3.0	2.3
16"	400	10"	250	400	250	375	75	4.0	4.0	4.0	4.0	3.0	2.3
		12"	300		315	213	43	4.0	4.0	4.0	4.0	3.0	2.3
		14"	350		355	113	23	4.0	4.0	4.0	4.0	3.0	2.3

Designation of a type X₄ Eccentric reducer corresponding to type B pipes, reduced from nominal size DN250 to nominal size DN200, for nominal pressure

PN6 with plain end and with CPVC liner : Reducer DIN16966-X₄B250x200-6CPVC

REDUCED AND EQUAL TEE / TIE-IN REINFORCEMENT

Structural part is based on premium grade epoxy vinylester resin.
Design in compliance to DIN 16 965 part 2 TypeB & DIN 16966 Part 8



¹ Equal tee are may be injection molded (up to 2"Ø)
PVC-U, PVC-EN, PVC-C and PPH&PPH2222

² Liner thickness is 3.5 mm

³ Liner thickness is 4.6 mm

⁴ Liner thickness is 4 mm

- Otherwise, liner thickness is the same as on laminated pipe section.

Mass of glass content S_g : 30% ± 5%

Stand alone tee's are supplied without FRP

Unlaminated fittings are prepared with knitted glass bonding layer except PVC-U, -EN, -C (Grinded surface only)

S_g - Structure laminate thk.HLU Use DN1 in Laminated Joint Section

S_g - Structure laminate thk.Filiment Wound See Laminated Pipe Section

Other Tees are available on request.

DN1		DN2		T1	Type of Support	T6	T7	DN1		DN2		T1	Type of Support	T6	T7
in	mm	in	mm					in	mm	in	mm				
1"	32	1"	32	43	Wrap	140	50	10"	250	10"	250	250	Wrap	560	150
1-1/2"	50	1-1/2"	50	58	Wrap	215	80			8"	200	250	Wrap	465	125
		1"	32	58	Wrap	140	50			6"	160	250	Wrap	330	80
2"	63	2"	63	70	Wrap	230	80			4"	110	250	Wrap	280	80
		1-1/2"	50	70	Wrap	215	80			3"	90	250	Ring	N/A	80
		1"	32	70	Wrap	140	50			2"	63	250	Ring		80
3"	90	3"	90	90	Wrap	255	80			1-1/2"	50	250	Ring		80
		2"	63	90	Wrap	230	80			1"	32	250	Ring	50	
		1-1/2"	50	90	Wrap	215	80			12"	315	315	Wrap	630	150
4"	110	1"	32	90	Ring		50			10"	250	315	Wrap	565	150
		4"	110	110	Wrap	275	80			8"	200	315	Wrap	465	125
		3"	90	110	Wrap	255	80			6"	160	315	Wrap	335	80
		2"	63	110	Wrap	230	80	4"	110	315	Ring	N/A	80		
		1-1/2"	50	110	Wrap	215	80	3"	90	315	Ring		80		
1"	32	110	Ring		50	2"	63	315	Ring	80					
6"	160	6"	160	160	Wrap	325	80	1-1/2"	50	315	Ring	80			
		4"	110	160	Wrap	275	80	1"	32	315	Ring	50			
		3"	90	160	Wrap	255	80	14"	355	355	Wrap	730	180		
		2"	63	160	Ring	N/A	50	12"	315	355	Wrap	630	150		
		1-1/2"	50	160	Ring		50	10"	250	355	Wrap	565	150		
8"	200	1"	32	160	Ring		50	8"	200	355	Wrap	465	125		
		8"	200	200	Wrap	460	125	6"	160	355	Wrap	335	80		
		6"	160	200	Wrap	330	80	4"	110	355	Ring	N/A	80		
		4"	110	200	Wrap	280	80	3"	90	355	Ring		80		
		3"	90	200	Wrap	260	80	2"	63	355	Ring		80		
		2"	63	200	Ring		80	1-1/2"	50	355	Ring	80			
		1-1/2"	50	200	Ring	N/A	80	1"	32	355	Ring	50			
		1"	32	200	Ring			50							

a PVDF lining: Tee DIN16966-T1B80-6L-PVDF

Designation of tee with reduced branch T2 corresponding to type B pipes, nominal size of run DN₁=400, nominal size of branch DN₂=80,

for type L laminated ends and PVDF lining: Tee DIN16966-T2B400x80-6L-PVDF

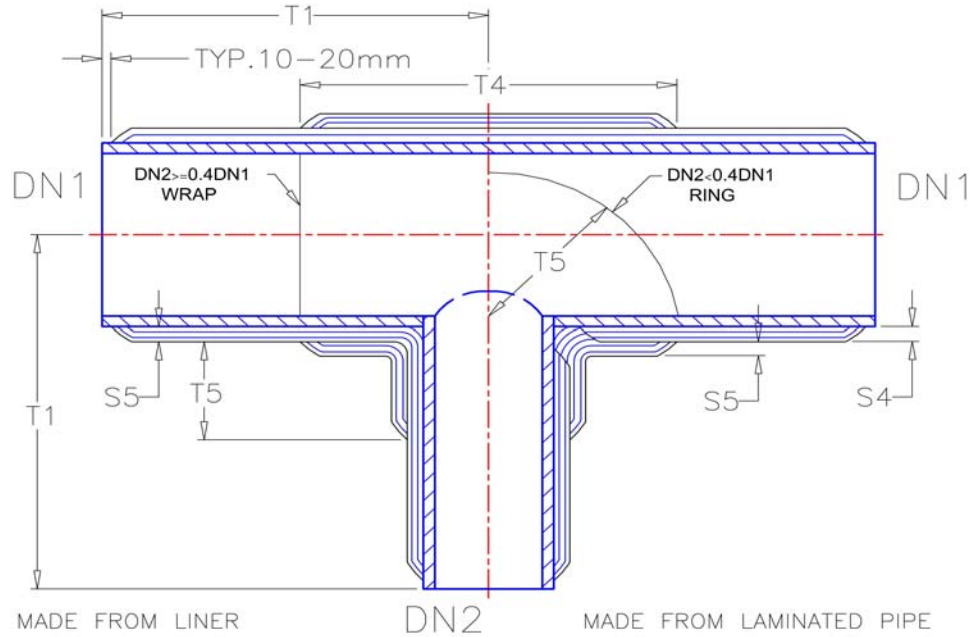
**REDUCED AND EQUAL TEE / TIE-IN
REINFORCEMENT**

Structural part is based on premium grade epoxy vinylester resin.
Design in compliance to DIN 16 965 part 2 TypeB & DIN 16966 Part 8

DN1		DN2		Type of				DN1		DN2		Type of				
in	mm	in	mm	T1	Support	T6	T7	in	mm	in	mm	T1	Support	T6	T7	
16"	400	16"	400	400	Wrap	820	200	28"	700	10"	250	700	Ring	N/A	150	
		14"	355	400	Wrap	735	180			8"	200	700	Ring		125	
		12"	315	400	Wrap	635	150			6"	160	700	Ring		80	
		10"	250	400	Wrap	570	150			4"	110	700	Ring		80	
		8"	200	400	Wrap	470	125			3"	90	700	Ring		80	
		6"	160	400	Wrap	340	80			2"	63	700	Ring		80	
		4"	110	400	Ring	N/A	80			1-1/2"	50	700	Ring		80	
		3"	90	400	Ring		80			1"	32	700	Ring		50	
		2"	63	400	Ring		80			32"	800	800	Wrap		1640	400
		1-1/2"	50	400	Ring		80			28"	700	800	Wrap		1440	350
1"	32	400	Ring	50	24"		600	800	Wrap	1240	300					
18"	450	18"	450	450	Wrap	930	230	32"	800	20"	500	800	Wrap	1040	250	
		16"	400	450	Wrap	825	200			18"	450	800	Wrap	950	230	
		14"	355	450	Wrap	735	180			16"	400	800	Wrap	840	200	
		12"	315	450	Wrap	635	150			14"	355	800	Wrap	755	180	
		10"	250	450	Wrap	570	150			12"	315	800	Ring	150		
		8"	200	450	Wrap	470	125			10"	250	800	Ring	150		
		6"	160	450	Ring	N/A	80			8"	200	800	Ring	125		
		4"	110	450	Ring		80			6"	160	800	Ring	80		
		3"	90	450	Ring		80			4"	110	800	Ring	80		
		2"	63	450	Ring		80			3"	90	800	Ring	80		
1-1/2"	50	450	Ring	80	2"		63	800	Ring	80						
1"	32	450	Ring	50	1-1/2"	50	800	Ring	80							
20"	500	20"	500	500	Wrap	1025	250	36"	900	1"	32	800	Ring	50		
		18"	450	500	Wrap	935	230			36"	900	900	Wrap	1845	450	
		16"	400	500	Wrap	825	200			32"	800	900	Wrap	1645	400	
		14"	355	500	Wrap	740	180			28"	700	900	Wrap	1445	350	
		12"	315	500	Wrap	640	150			24"	600	900	Wrap	1445	300	
		10"	250	500	Wrap	575	150			20"	500	900	Wrap	1045	250	
		8"	200	500	Wrap	475	125			18"	450	900	Wrap	955	230	
		6"	160	500	Ring	N/A	80			16"	400	900	Wrap	845	200	
		4"	110	500	Ring		80			14"	355	900	Ring	180		
		3"	90	500	Ring		80			12"	315	900	Ring	150		
2"	63	500	Ring	80	10"		250	900	Ring	150						
1-1/2"	50	500	Ring	80	8"		200	900	Ring	125						
1"	32	500	Ring	50	6"	160	900	Ring	80							
24"	600	24"	600	600	Wrap	1230	300	40"	1000	4"	110	900	Ring	80		
		20"	500	600	Wrap	1030	250			3"	90	900	Ring	80		
		18"	450	600	Wrap	940	230			2"	63	900	Ring	80		
		16"	400	600	Wrap	930	200			1-1/2"	50	900	Ring	80		
		14"	355	600	Wrap	745	180			1"	32	900	Ring	50		
		12"	315	600	Wrap	645	150			40"	1000	1000	Wrap	2050	500	
		10"	250	600	Wrap	580	150			36"	900	1000	Wrap	1850	450	
		8"	200	600	Ring	N/A	125			32"	800	1000	Wrap	1650	400	
		6"	160	600	Ring		80			28"	700	1000	Wrap	1450	350	
		4"	110	600	Ring		80			24"	600	1000	Wrap	1250	300	
3"	90	600	Ring	80	20"		500	1000	Wrap	1050	250					
2"	63	600	Ring	80	18"		450	1000	Wrap	960	230					
1-1/2"	50	600	Ring	80	16"	400	1000	Wrap	850	200						
1"	32	600	Ring	50	14"	355	1000	Ring	180							
28"	700	28"	700	700	Wrap	1435	350	12"	315	1000	Ring	150				
		24"	600	700	Wrap	1235	300	10"	250	1000	Ring	150				
		20"	500	700	Wrap	1035	250	8"	200	1000	Ring	125				
		18"	450	700	Wrap	945	230	6"	160	1000	Ring	80				
		16"	400	700	Wrap	935	200	4"	110	1000	Ring	80				
		14"	355	700	Wrap	750	180	3"	90	1000	Ring	80				
		12"	315	700	Wrap	650	150	2"	63	1000	Ring	80				
										1-1/2"	50	1000	Ring	80		
										1"	32	1000	Ring	50		

**REDUCED AND EQUAL TEE / TIE-IN
PRE-LAMINATED**

Structural part is based on premium grade epoxy vinylester resin.
Design in compliance to DIN 16 965 part 2 TypeB & DIN 16966 Part 8



¹ Equal tee are may be injection molded (up to 2"Ø)
PVC-U, PVC-EN, PVC-C and PPH&PPH2222

² Liner thickness is 3.5 mm

³ Liner thickness is 4.6 mm

⁴ Liner thickness is 4 mm

Otherwise, liner thickness is the same as on laminated pipe section.

Mass of glass content S_g: 30% ± 5%

T₁ is the minimum length.

Stand alone tee's are supplied with FRP

Reinforcement on Tee less than 4"Ø is obtained from joint lamination

Unlaminated fittings are prepared with knitted glass bonding layer except PVC-U, -EN, -C (Grinded surface only)

S_g - Structure laminate thk.HLU Use DN1 in Laminated Joint Section

S_g - Structure laminate thk.Filiment Wound See Laminated Section

Other Tees are available on request.

DN1		DN2		T1	Type of Support	T4	T5	DN1		DN2		T1	Type of Support	T4	T5		
in	mm	in	mm					in	mm	in	mm						
1"	32	1"	32	43	N/A	265	50	10"	250	10"	250	250	Wrap	440	90		
1-½"	50	1-½"	50	58						8"	200	250	Wrap	370	80		
		1"	32	58						6"	160	250	Wrap	330	80		
2"	63	2"	63	70						4"	110	250	Wrap	280	80		
		1-½"	50	70						3"	90	250	Ring	N/A	80		
3"	90	3"	90	90						2"	63	250	Ring		80		
		2"	63	90						1-½"	50	250	Ring		80		
		1-½"	50	90						1"	32	250	Ring		80		
4"	110	4"	110	110						12"	315	12"	315	315	Wrap	580	125
		3"	90	110						10"		250	315	Wrap	445	90	
		2"	63	110				8"	200	315		Wrap	375	80			
		1-½"	50	110				6"	160	315		Wrap	335	80			
		1"	32	110				4"	110	315		Ring	N/A	80			
6"	160	6"	160	160				3"	90	315	Ring	80					
		4"	110	160				2"	63	315	Ring	80					
		3"	90	160				1-½"	50	315	Ring	80					
		2"	63	160				1"	32	315	Ring	80					
		1-½"	50	160				14"	355	355	Wrap	620	125				
		1"	32	160				12"	315	355	Wrap	580	125				
8"	200	8"	200	200				10"	250	355	Wrap	445	90				
		6"	160	200	8"	200	355	Wrap	375	80							
		4"	110	200	6"	160	355	Wrap	335	80							
		3"	90	200	4"	110	355	Ring	N/A	80							
		2"	63	200	3"	90	355	Ring		80							
		1-½"	50	200	2"	63	355	Ring		80							
		1"	32	200	1-½"	50	355	Ring		80							
		1"	32	200	1"	32	355	Ring		80							

a PVDF lining: Tee DIN16966-T1B80-6L-PVDF

Designation of tee with reduced branch T2 corresponding to type B pipes, nominal size of run DN₁=400, nominal size of branch DN₂=80,

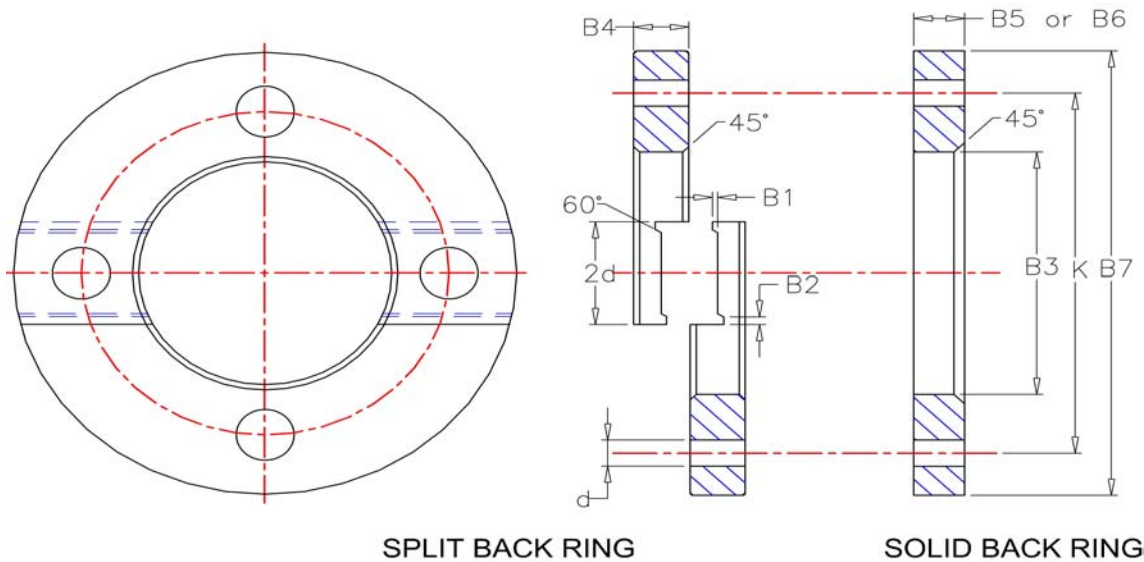
for type L laminated ends and PVDF lining: Tee DIN16966-T2B400x80-6L-PVDF

**REDUCED AND EQUAL TEE
PRE-LAMINATED**

Structural part is based on premium grade epoxy vinylester resin.
Design in compliance to DIN 16 965 part 2 TypeB & DIN 16966 Part 8

DN1		DN2		Type of				DN1		DN2		Type of				
in	mm	in	mm	T1	Support	T4	T5	in	mm	in	mm	T1	Support	T4	T5	
16"	400	16"	400	400	Wrap	700	140	28"	700	10"	250	700	Ring	N/A	90	
		14"	355	400	Wrap	625	125			8"	200	700	Ring		80	
		12"	315	400	Wrap	585	125			6"	160	700	Ring		80	
		10"	250	400	Wrap	450	90			4"	110	700	Ring		80	
		8"	200	400	Wrap	380	80			3"	90	700	Ring		80	
		6"	160	400	Wrap	340	80			2"	63	700	Ring		80	
		4"	110	400	Ring	N/A	80			1-1/2"	50	700	Ring		80	
		3"	90	400	Ring	N/A	80			1"	32	700	Ring		80	
		2"	63	400	Ring	N/A	80			32"	800	800	Wrap		1200	180
		1-1/2"	50	400	Ring	N/A	80			28"	700	800	Wrap		1060	160
1"	32	400	Ring	N/A	80	24"	600	800	Wrap	960	160					
18"	450	18"	450	450	Wrap	750	140	32"	800	20"	500	800	Wrap	820	140	
		16"	400	450	Wrap	700	140			18"	450	800	Wrap	770	140	
		14"	355	450	Wrap	625	125			16"	400	800	Wrap	720	140	
		12"	315	450	Wrap	585	125			14"	355	800	Wrap	645	125	
		10"	250	450	Wrap	450	90			12"	315	800	Ring	N/A	125	
		8"	200	450	Wrap	830	80			10"	250	800	Ring	N/A	90	
		6"	160	450	Ring	N/A	80			8"	200	800	Ring	N/A	80	
		4"	110	450	Ring	N/A	80			6"	160	800	Ring	N/A	80	
		3"	90	450	Ring	N/A	80			4"	110	800	Ring	N/A	80	
		2"	63	450	Ring	N/A	80			3"	90	800	Ring	N/A	80	
1-1/2"	50	450	Ring	N/A	80	2"	63	800	Ring	N/A	80					
1"	32	450	Ring	N/A	80	1-1/2"	50	800	Ring	N/A	80					
20"	500	20"	500	500	Wrap	805	140	36"	900	1"	32	800	Ring	N/A	80	
		18"	450	500	Wrap	755	140			36"	900	900	Wrap	1305	180	
		16"	400	500	Wrap	705	140			32"	800	900	Wrap	1205	180	
		14"	355	500	Wrap	630	125			28"	700	900	Wrap	1065	160	
		12"	315	500	Wrap	590	125			24"	600	900	Wrap	965	160	
		10"	250	500	Wrap	455	90			20"	500	900	Wrap	825	140	
		8"	200	500	Wrap	385	80			18"	450	900	Wrap	775	140	
		6"	160	500	Ring	N/A	80			16"	400	900	Wrap	725	140	
		4"	110	500	Ring	N/A	80			14"	355	900	Ring	N/A	125	
		3"	90	500	Ring	N/A	80			12"	315	900	Ring	N/A	125	
2"	63	500	Ring	N/A	80	10"	250	900	Ring	N/A	90					
1-1/2"	50	500	Ring	N/A	80	8"	200	900	Ring	N/A	80					
1"	32	500	Ring	N/A	80	6"	160	900	Ring	N/A	80					
24"	600	24"	600	600	Wrap	950	160	40"	1000	4"	110	900	Ring	N/A	80	
		20"	500	600	Wrap	810	140			3"	90	900	Ring	N/A	80	
		18"	450	600	Wrap	760	140			2"	63	900	Ring	N/A	80	
		16"	400	600	Wrap	710	140			1-1/2"	50	900	Ring	N/A	80	
		14"	355	600	Wrap	635	125			1"	32	900	Ring	N/A	80	
		12"	315	600	Wrap	595	125			40"	1000	1000	Wrap	1450	200	
		10"	250	600	Wrap	460	90			36"	900	1000	Wrap	1310	180	
		8"	200	600	Ring	N/A	80			32"	800	1000	Wrap	1210	180	
		6"	160	600	Ring	N/A	80			28"	700	1000	Wrap	1070	160	
		4"	110	600	Ring	N/A	80			24"	600	1000	Wrap	970	160	
3"	90	600	Ring	N/A	80	20"	500	1000	Wrap	830	140					
2"	63	600	Ring	N/A	80	18"	450	1000	Wrap	780	140					
1-1/2"	50	600	Ring	N/A	80	16"	400	1000	Wrap	730	140					
1"	32	600	Ring	N/A	80	14"	355	1000	Ring	N/A	125					
28"	700	28"	700	700	Wrap	1055	160	12"	315	1000	Ring	N/A	125			
		24"	600	700	Wrap	955	160	10"	250	1000	Ring	N/A	90			
		20"	500	700	Wrap	815	140	8"	200	1000	Ring	N/A	80			
		18"	450	700	Wrap	765	140	6"	160	1000	Ring	N/A	80			
		16"	400	700	Wrap	715	140	4"	110	1000	Ring	N/A	80			
		14"	355	700	Wrap	640	125	3"	90	1000	Ring	N/A	80			
		12"	315	700	Wrap	600	125	2"	63	1000	Ring	N/A	80			
										1-1/2"	50	1000	Ring		80	
										1"	32	1000	Ring		80	

BACK RING FOR LOOSE FLANGES



SPLIT BACK RING

SOLID BACK RING

1"Ø to 24"Ø ANSI B16.5 150 # Drill Pattern Only
 28"Ø to 40"Ø ANSI B16.47 150 # Drill Pattern Only
 DN25 to DN1000 DIN 2501 PN10 Drill Pattern Only

N: Number of Bolts

K - Bolt circle diameter

d - Hole diameter

Drawing shows both split ring and solid back ring, top view for split ring only

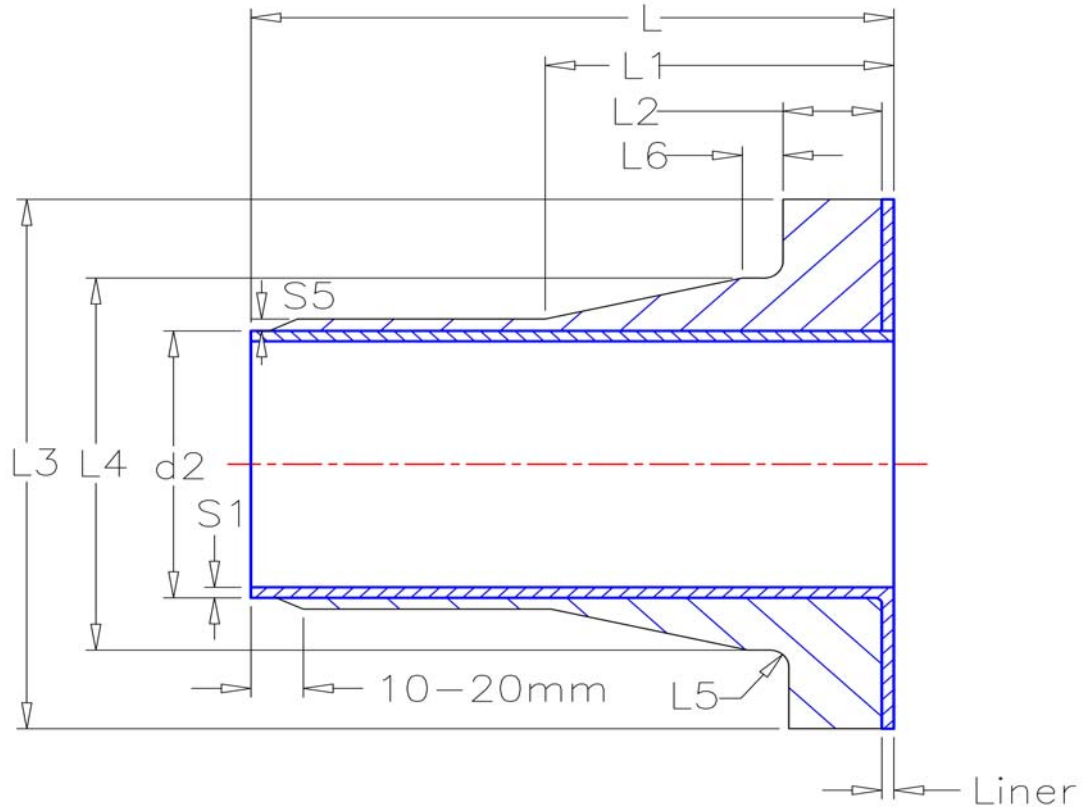
Material of Construction Available:

- Aluminum
- Carbon Steel Painted Dimension B6
- Carbon Steel Galvanized Dimension B6
- Stainless Steel (Choice of 300 series)
- FRP (Unsaturated Polyester) Dimension B5

DN		Flange information								ANSI Drilling Pattern			DIN Drilling Pattern		
in	mm	PN	B1	B2	B3	B4	B5	B6	B7	K	d	N	K	d	N
1"	25	16	3	4	51	18	19	16	115	79.2	16	4	85	14	4
1-1/2"	40	16	3	4	69	18	19	16	150	98.6	16	4	110	18	4
2"	50	16	3	4	83	20	19	18	165	120.6	19	4	125	18	4
3"	80	10	3	4	112	20	22	18	200	152.4	19	4	160	18	4
4"	100	10	4	6	134	20	24	18	229	190.5	19	8	180	18	8
6"	150	10	4	6	189	20	30	18	285	241.3	22	8	240	22	8
8"	200	10	4	6	238	22	32	20	343	298.4	22	8	295	22	8
10"	250	10	5	8	294	24	34	22	406	361.9	25	12	350	22	12
12"	300	10	5	8	344	28	36	26	483	431.8	25	12	400	22	12
14"	350	6	NA	NA	388	NA	38	28	533	476.2	29	12	460	22	16
16"	400	6	NA	NA	441	NA	42	32	597	539.8	29	16	515	26	16
18"	450	6	NA	NA	491	NA	44	36	635	577.9	32	16	578	26	16
20"	500	6	NA	NA	546	NA	47	38	698	635.0	32	20	620	26	20
24"	600	6	NA	NA	650	NA	50	36	813	749.3	35	20	725	30	20
28"	700	4	NA	NA	760	NA	NA	40	927	863.6	35	28	840	30	24
32"	800	4	NA	NA	860	NA	NA	44	1061	977.9	41	28	950	30	24
36"	900	4	NA	NA	962	NA	NA	48	1168	1085.8	41	32	1050	30	28
40"	1000	4	NA	NA	1062	NA	NA	52	1289	1200.1	41	36	1160	34	28

LOOSE FLANGE

Structural part is based on premium grade epoxy vinyl ester resin.
Design in compliance to DIN16966 part 6 Type B2



- L1 - Hub length
- L2 - Flange face lamination thickness
- L3 - Outside flange diameter
- L4 - Hub diameter
- Mass of glass content S_5 : 30% \pm 5%
- L6=1/2 B5 from Back Ring
- d2 for PPH = 630mm \varnothing
- Liner=3mm for PVDF
- Liner=2.3mm for ECTFE

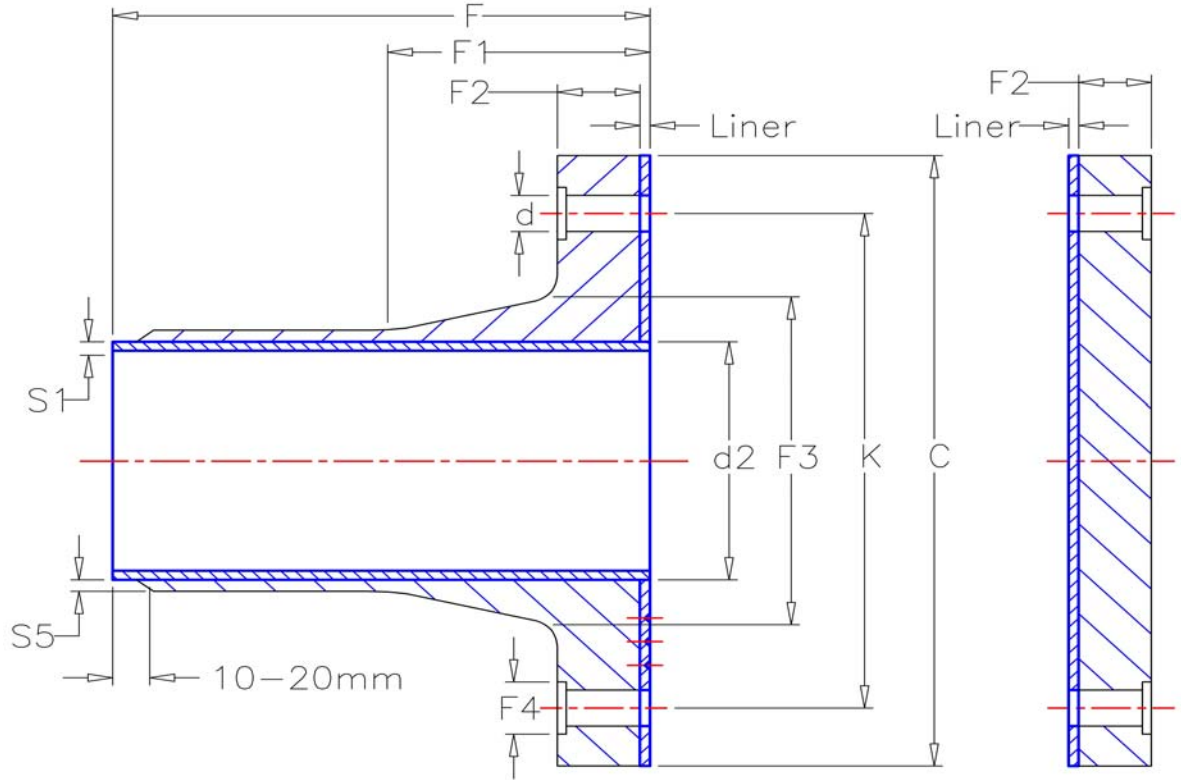
Liner=6mm \pm 1mm for PVC-U, PVC-EN, CPV-C and PPH & PPH2222
* = DIN L3 dim, for ANSI 12" \varnothing L3 = 398mm

DN		LINER S_1							Flange information							
in	mm	d_2	PVC-U	PVC-EN	PVC-C	PPH & PPH2222	PVDF	ECTFE	PN	S_5	L	L1	L2	L3	L4	L5
1"	25	32	3.5	3.5	3.5	3.5	2.4	2.4	16	4.0	135	110	19	63	49	2
1-1/2"	40	50	4.6	4.6	4.6	4.6	3.0	3.0	16	4.0	135	110	19	82	67	2
2"	50	63	4.0	4.0	4.0	4.0	3.0	3.0	16	4.0	140	115	19	102	81	2
3"	80	90	4.0	4.0	4.0	4.0	2.8	2.8	10	4.0	145	120	19	134	110	2
4"	100	110	4.5	4.5	4.5	4.5	3.0	3.0	10	4.2	150	125	20	162	132	2
6"	150	160	6.0	6.0	6.0	6.0	3.0	3.0	10	4.9	160	135	24	218	187	2
8"	200	200	6.2	4.0	4.0	4.9	3.0	2.3	10	6.2	250	140	27	273	236	3
10"	250	250	7.7	4.9	4.9	6.2	3.0	2.3	10	7.4	250	140	30	328	292	3
12"	300	315	9.7	4.5	4.5	7.7	4.0	2.3	10	8.7	250	150	32	378*	341	3
14"	350	355	4.0	4.5	4.5	8.7	4.0	2.3	6	6.4	250	160	34	438	386	6
16"	400	400	4.0	5.0	5.0	9.8	3.0	2.3	6	7.1	250	170	37	482	439	6
18"	450	450	4.0	5.0	5.0	8.0	3.0	2.3	6	8.6	250	180	39	532	489	6
20"	500	500	4.0	5.0	5.0	4.0	3.0	2.3	6	8.6	300	180	40	585	544	6
24"	600	600	4.0	5.0	5.0	4.0	3.0	2.3	6	10.2	300	180	47	685	648	6
28"	700	710	4.0	4.0	4.0	4.0	3.0	2.3	4	8.1	300	185	55	800	758	8
32"	800	800	4.0	4.0	4.0	4.0	3.0	2.3	4	9.1	300	185	59	905	858	8
36"	900	900	4.0	4.0	4.0	4.0	3.0	2.3	4	10.1	300	185	62	1005	960	8
40"	1000	1000	4.0	4.0	4.0	4.0	3.0	2.3	4	11.1	300	185	66	1110	1060	8

Designation of a type B2 formed collar appropriate for pipe type B, nominal size DN150, for nominal pressure PN 10 : Collar **DIN16966-B2B150-10**

FULL FACE FLANGE

Structural part is based on premium grade epoxy vinylester resin.
Design in compliance to DIN16966 part 6 Type V3 up to DN300



- F1- Hub length
- F2 - Flange thickness
- F3 - Hub diameter
- F4 - Washer Spot Face
- C - Outside flange diameter
- Mass of glass content S₃ : 30% ± 5%

Type1 flange is without groove
Type2 flange is with groove

Liner=3mm for PVDF

Liner=2.3mm for ECTFE

Liner=6mm ±1mm for PVC-U,PVC-EN,CPV-C and PPH&PPH2222

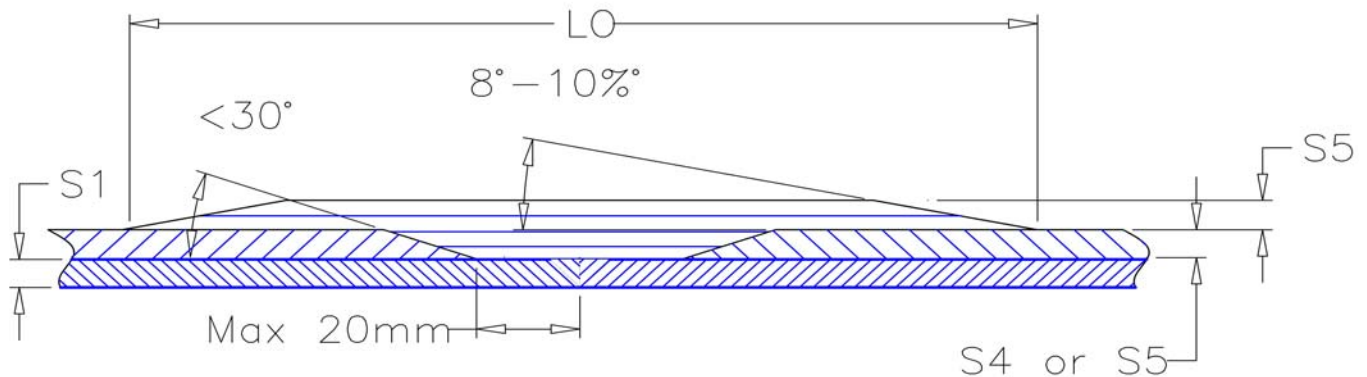
Higher pressure ratings available on request

Liners 6"Ø & below are injection molded for PVC-EN, PVC-C & PPH / PPH 2222

DN		Flange information								ANSI Drilling Pattern				DIN Drilling Pattern			
in	mm	d ₂	PN	S ₅	F	F1	F2	F3	F4	C	K	d	N	C	K	d	N
1"	25	32	16	4.0	200	110	19	49	27	114	79.2	16	4	115	85.0	14	4
1-½"	40	50	16	4.0	200	110	19	67	27	140	98.6	16	4	150	110.0	18	4
2"	50	63	16	4.0	200	115	19	81	33	152	120.6	19	4	165	125.0	18	4
3"	80	90	10	4.0	200	120	22	110	33	191	152.4	19	4	200	160.0	18	4
4"	100	110	10	4.0	200	125	24	132	33	229	190.5	19	8	220	180.0	18	8
6"	150	160	10	4.0	200	135	30	187	38	279	241.3	22	8	285	240.0	22	8
8"	200	200	10	5.5	250	140	33	236	38	343	298.4	22	8	340	295.0	22	8
10"	250	250	10	6.5	250	160	37	292	44	406	361.9	26	12	395	350.0	22	12
12"	300	315	10	8.0	250	180	45	360	44	483	431.8	26	12	445	400.0	22	12
14"	350	355	6	5.0	250	170	40	395	51	533	476.2	29	12	505	460.0	22	16
16"	400	400	6	5.5	250	180	44	444	51	597	539.8	29	16	565	515.0	26	16
18"	450	450	6	7.0	250	200	48	500	57	635	577.9	32	16	635	577.8	26	16
20"	500	500	6	8.0	300	200	49	550	57	698	635.0	32	20	670	620.0	26	20
24"	600	600	6	9.5	300	220	54	655	64	813	749.3	35	20	780	725.0	30	20
28"	700	710	4	10.4	300	220	53	755	64	927	863.6	35	28	895	840.0	30	24
32"	800	800	4	12.0	300	230	56	860	70	1061	977.9	41	28	1015	950.0	30	24
36"	900	900	4	13.5	300	240	59	960	70	1168	1085.8	41	32	1115	1050.0	30	28
40"	1000	1000	4	15.0	300	260	63	1070	70	1289	1200.1	41	36	1230	1160.0	34	28

Designation of a type V3 formed integral flange, nominal size DN700, flange connecting dimensions in accordance with PN10, for pipes for nominal pressure PN 2.5 : **DIN16966-V3-700-10-2.5**

**LAMINATED JOINT
& CONTACT MOULDED STRUCTURAL THICKNESS**
 Structural part is based on premium grade epoxy vinylester resin.
 Design in compliance to DIN 16 966 Part 8



Lamination thickness S5 is the HLU structural thickness

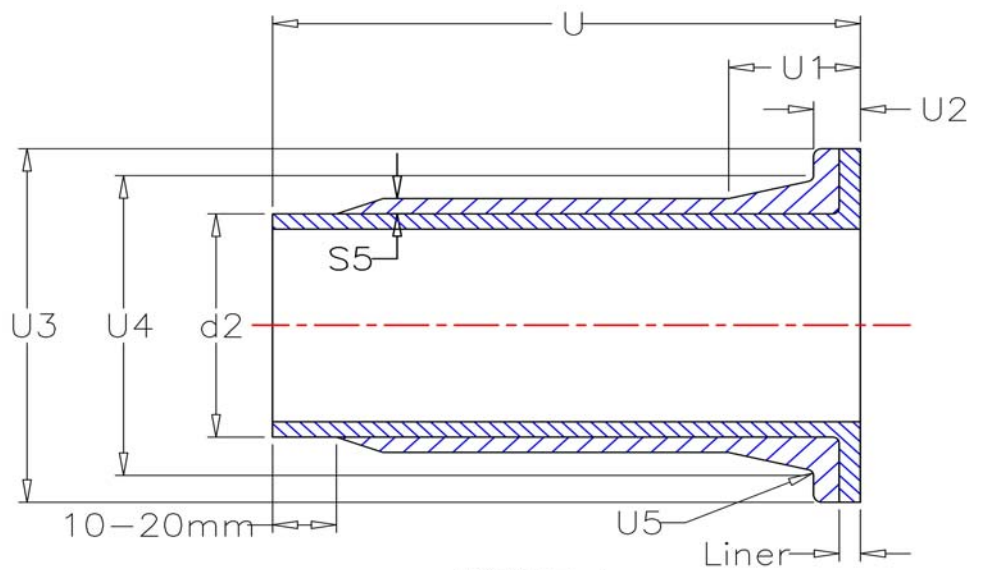
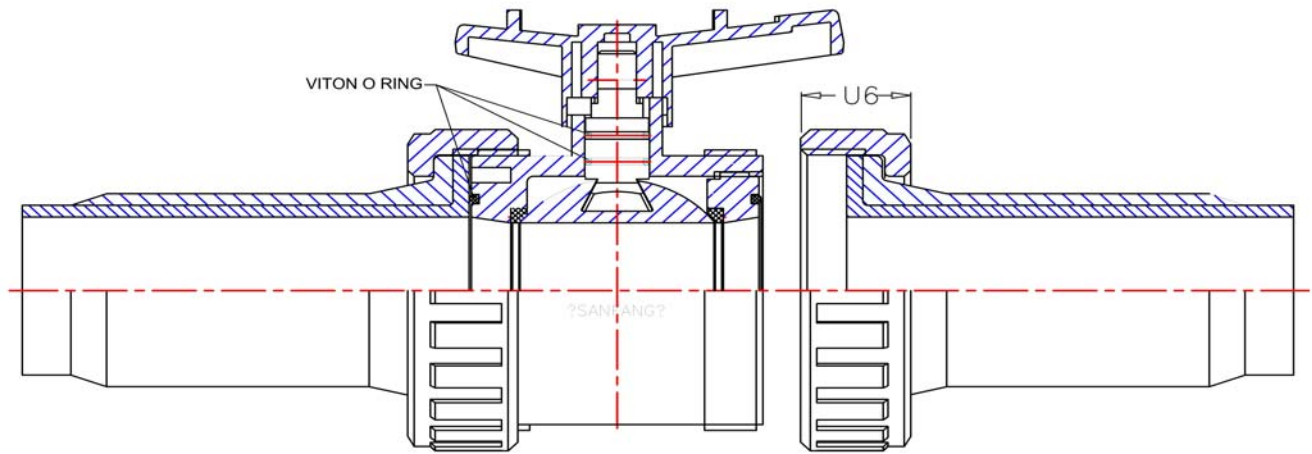
Lamination thickness S4 is the Filament Wound or Ortho structural thickness

Mass of glass content S_3 : 35% \pm 5%

Material density of FRP is 1.9g/cm³

DN			PN 6		PN 10		PN 16	
in	mm	d2	S5	LO	S5	LO	S5	LO
1"	25	32	4.0	110	4.0	110	4.0	110
1-1/2"	40	50	4.0	110	4.0	110	4.0	110
2"	50	63	4.0	110	4.0	110	4.0	110
3"	80	90	4.0	110	4.0	110	4.0	120
4"	100	110	4.0	110	4.0	110	4.5	140
6"	150	160	4.0	110	4.0	130	6.5	175
8"	200	200	4.0	110	5.5	165	8.5	210
10"	250	250	4.0	125	6.5	205	10.5	280
12"	300	315	4.0	150	8.0	250	12.5	345
14"	350	355	5.0	170	9.0	290	15.0	415
16"	400	400	5.5	200	10.5	330	17.0	460
18"	450	450	6.9	240	11.5	380	18.8	580
20"	500	500	8.0	240	13.0	410	21.0	685
24"	600	600	9.5	290	15.5	480	25.0	745
28"	700	710	11.0	335	18.0	560	29.5	880
32"	800	800	12.5	390	20.5	640	33.5	990
36"	900	900	14.0	430	23.0	720	37.5	1115
40"	1000	1000	15.5	480	26.0	795	42.0	1235

Designation example for type B glass fiber reinforced vinylester resin pipe, nominal size DN250, for nominal pressure PN6 and with CPVC liner : **DIN16965-B250-6CPVC**

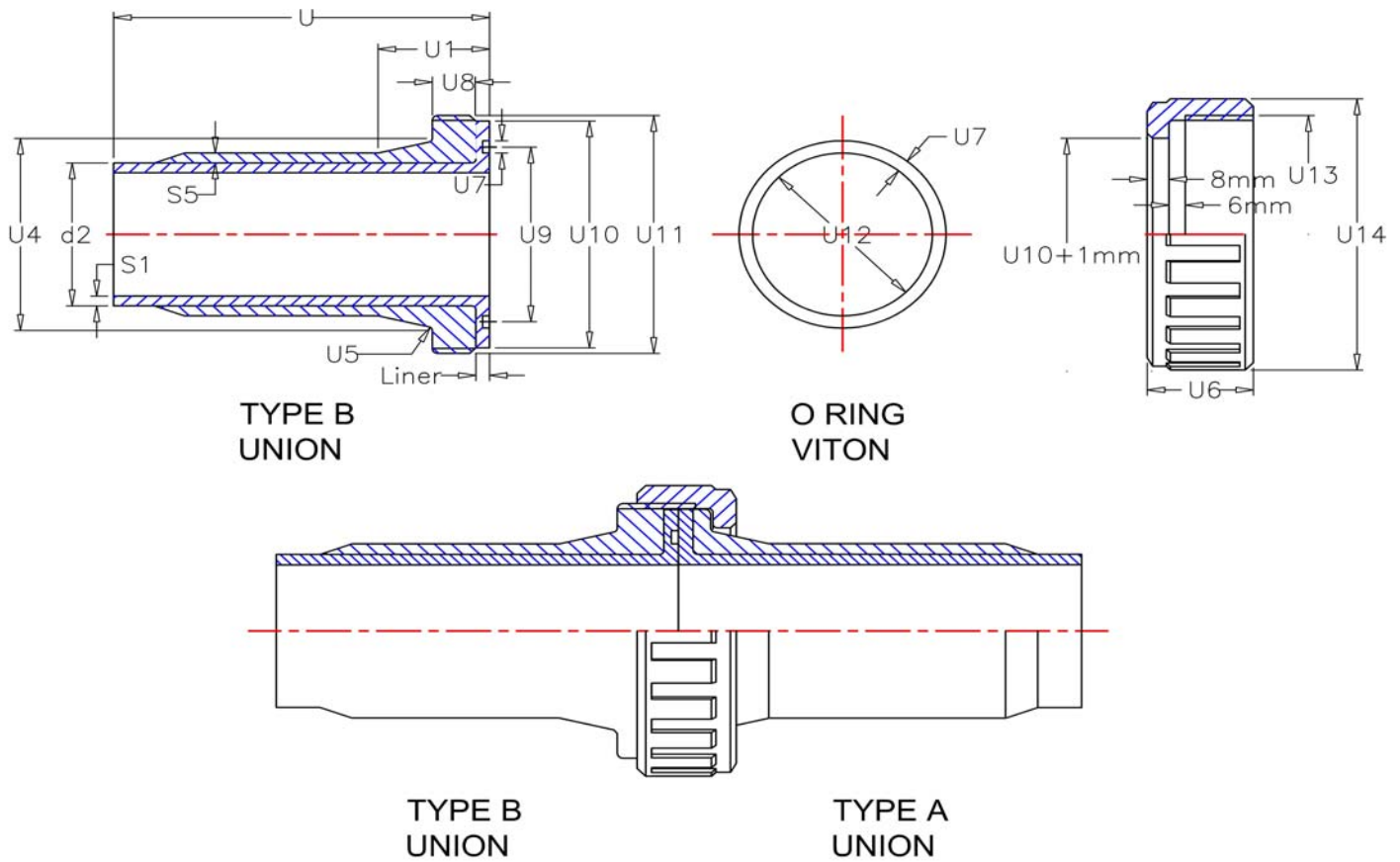


TYPE A UNION

- U- Manufactured Length
- U1 - Hub length
- U2 - Flange face lamination thickness
- U3 - Outside flange diameter
- U4 - Hub diameter
- Liner=3mm for PVDF
- Liner=2.3mm for ECTFE
- Liner=5mm ±1mm for PVC-U,PVC-EN,CPV-C and PPH&PPH2222
- * For PVC-U,PVC-EN,CPV-C and PPH&PPH2222
- VALVE AVAILABLE: PVC, PVC-C, PPH and PVDF.

DN		LINER S ₁							Stub Flange information								
in	mm	d ₂	PVC-U	PVC-EN	PVC-C	PPH & PPH2222	PVDF	ECTFE	PN	S ₅	U	U1	U2	U3	U4	U5	U6
1"	25	32	3.5	3.5	3.5	3.5	2.4	2.4	10	4.0	110	85	6	56	46	2	26
1-1/2"	40	50	4.6	4.6	4.6	4.6	3.0	3.0	10	4.0	110	85	6	75	65	2	34
2"	50	63	4.0	4.0	4.0	4.0	3.0	3.0	10	4.0	115	90	6	94	77	2	38
3"	80	90	4.0	4.0	4.0	4.0	2.8	2.8	6	4.0	120	95	8	140	115	2	48
4"	100	110	4.5	4.5	4.5	4.5	3.0	3.0	6	4.2	125	100	8	165	134	2	56

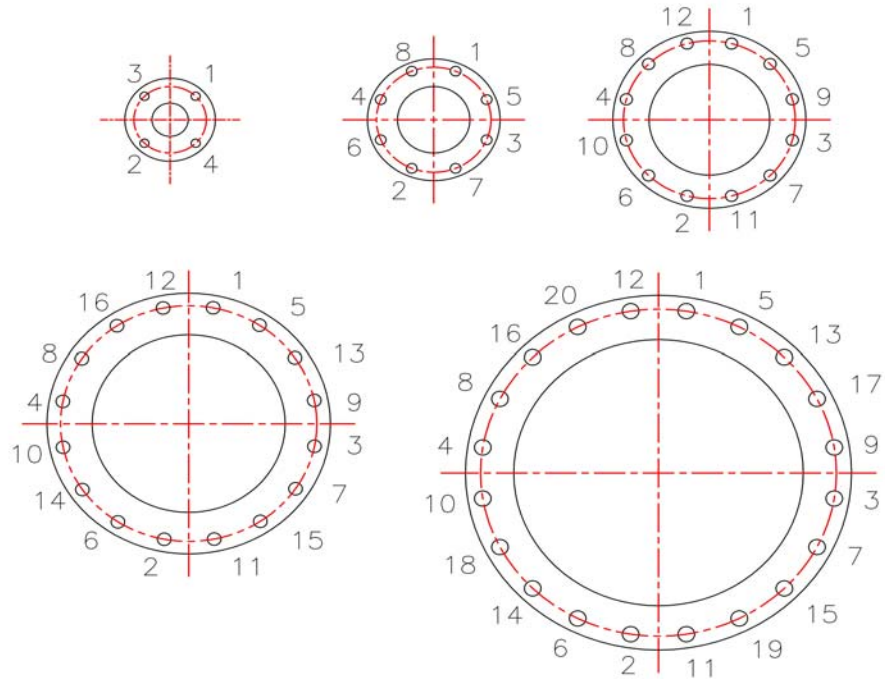
LOOSE FLANGE FOR UNION ADAPTERS WITHOUT VALVE



U, U4, U5, U6 Same as Type A Valve Union

DN		LINER S ₁							Stub Flange and Union information						
in	mm	d ₂	PVC-U	PVC-EN	PVC-C	PPH & PPH2222	PVDF	ECTFE	PN	U8	U1	U11	U14	U9	U12 x U7
1"	25	32	3.5	3.5	3.5	3.5	2.4	2.4	10	16	95	M62×2	72	36	31.9×3.1
1-1/2"	40	50	4.6	4.6	4.6	4.6	3.0	3.0	10	16	95	M80×2	92	44	46.5×3.5
2"	50	63	4.0	4.0	4.0	4.0	3.0	3.0	10	16	100	M100×3	114	48	59×4
3"	80	90	4.0	4.0	4.0	4.0	2.8	2.8	6	18	105	M145×3	158	58	89.3×5.7
4"	100	110	4.5	4.5	4.5	4.5	3.0	3.0	6	18	110	M170×3	185	66	114.3×5.7

RECOMMENDED TORQUE VALUES FOR FLANGES



- DN : Nominal diameter

Contact AC plastiques in the following cases

Dia. Exceeding 20"

Gasket selection differs from table here below

For PTFE coated A193 B7 bolts

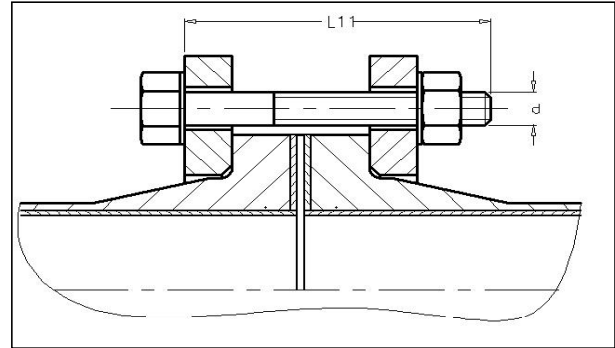
Notes to follow in conjunction with table below :

- 1- Always use flat washers on both sides of the connection
- 2- Tighten the flange bolts with a torque wrench, using a crisscross pattern as above illustration
- 3- Retorque to recommended value 24 hours to allow for relaxation of the bolts
- 4- Values here below are based on lightly oiled A193 B7 bolts & A194 2H nuts
- 5- Recommended torque values based on use of EPDM gasket
- 5- For PTFE coated A193 B7 bolts, contact ACP

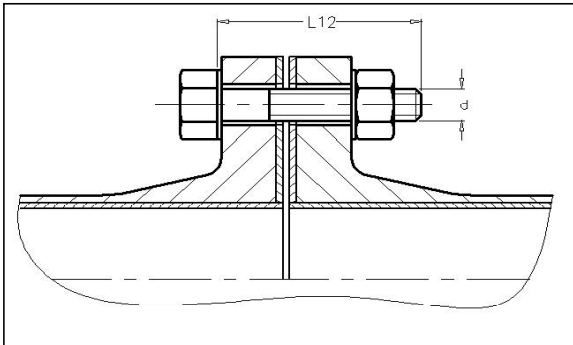
DN		PN2.5		PN4		PN6		PN10		EPDM PTFE Coated		Garlock Stress Saver 370		Maximum Torque	
in	mm	Ft.Lbs	N.m	Ft.Lbs	N.m	Ft.Lbs	N.m	Ft.Lbs	N.m	Ft.Lbs	N.m	Ft.Lbs	N.m	Ft.Lbs	N.m
3/4"	20	11.0	11	11.1	15	11.1	15	11.0	15	15.0	20.3	15.0	20.3	17.0	23.0
1"	25	11.1	15	11.1	15	11.1	15	19.0	26	15.0	20.3	15.0	20.3	19.0	25.8
1-1/2"	40	11.1	15	11.1	15	11.1	15	22.0	30	18.0	24.4	20.0	27.1	22.0	29.8
2"	50	11.1	15	11.1	15	11.1	15	31.0	42	18.0	24.4	35.0	47.5	31.0	42.0
3"	80	11.1	15	11.1	15	11.1	15	51.0	69	26.0	35.2	50.0	67.8	51.0	69.1
4"	100	14.8	20	14.8	20	14.8	20	29.0	39	26.0	35.2	35.0	47.5	29.0	39.3
6"	150	29.5	40	29.5	40	29.5	40	70.0	95	29.0	39.3	45.0	61.0	70.0	94.9
8"	200	36.9	50	36.9	50	47.9	65	103.0	140	37.0	50.2	65.0	88.1	103.0	139.6
10"	250	36.9	50	36.9	50	47.9	65	98.0	133	37.0	50.2	65.0	88.1	98.0	132.9
12"	300	36.9	50	44.3	60	59.0	80	150.0	203	44.0	59.7	95.0	128.8	150.0	203.4
14"	350	36.9	50	44.3	60	59.0	80	161.0	218	NA	NA	135.0	183.0	161.0	218.3
16"	400	51.6	70	66.4	90	81.1	110	142.0	193	NA	NA	120.0	162.7	142.0	192.5
18"	450	51.6	70	73.8	100	88.5	120	221.0	300	NA	NA	NA	NA	221.0	299.6
20"	500	62.7	85	62.7	85	88.5	120	182.0	247	NA	NA	NA	NA	181.0	245.4

BOLT LENGTH

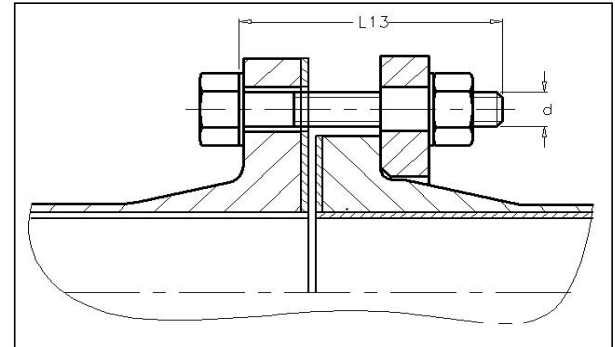
d_2 - Outside diameter of liner
 T - Flange face lamination thickness
 T_{FRP} - FRP back ring thickness
 T_{Steel} - Steel back ring thickness
 t - Flange face liner thickness
 d_b - bolt diameter
 N - Number of holes
 $t=4.5\text{mm} \pm 2.5\text{mm}$
 Gaskets are 3mm thk.



Loose flange with loose flange (steel back ring and FRP back ring)



Full face with full face or full face with blind flange

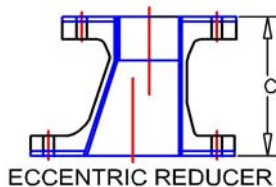
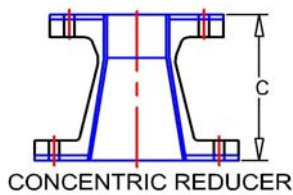
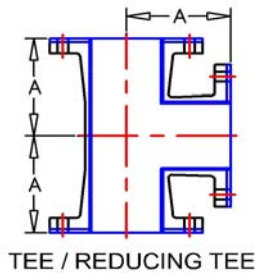
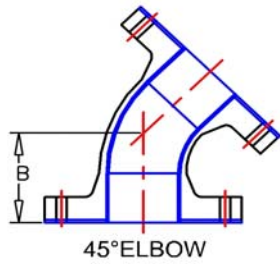
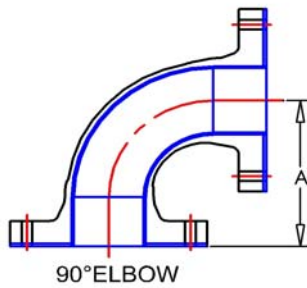


Loose flange with full face or with blind flange
(steel back ring and FRP back ring)

DN		FF&BF		VS		VS		Bolts		FRP _{BACK RING}			STEEL _{BACK RING}		
										VS#VS	FF#FF	FF#VS	VS#VS	FF#VS	
in	mm	d_2 mm	PN mm	T mm	PN mm	T mm	T_{FRP} mm	T_{STEEL} mm	d_b in	N	L_{11} mm	L_{12} mm	L_{13} mm	L_{11} mm	L_{13} mm
1"	25	32	16	16	16	19	19	16	1/2	4	120	76	98	114	95
1-1/2"	40	50	16	16	16	19	19	16	1/2	4	120	76	98	114	95
2"	50	63	16	18	16	19	19	18	5/8	4	123	83	103	121	102
3"	80	90	10	22	10	19	22	18	5/8	4	129	91	110	121	106
4"	100	110	10	24	10	19	24	18	5/8	8	133	95	114	121	108
6"	150	160	10	30	10	22	30	18	3/4	8	154	110	132	130	120
8"	200	200	6	33	6	26	32	20	3/4	8	166	116	141	142	129
10"	250	250	6	37	6	29	34	22	7/8	12	180	128	154	156	142
12"	300	315	6	42	6	31	36	26	7/8	12	188	138	163	168	153
14"	350	355	4	40	4	33	38	28	1	12	199	137	168	179	158
16"	400	400	4	44	4	36	42	32	1	16	213	145	179	193	169
18"	450	450	4	48	4	37	44	36	1 1/8	16	222	156	189	206	181
20"	500	500	4	49	4	38	47	38	1 1/8	20	230	158	194	212	185
24"	600	600	2.5	49	2.5	45	50	36	1 1/4	20	250	158	204	222	190
28"	700	710	2.5	53	2.5	53	N/D	40	1 1/4	28	N/D	169	N/D	249	209
32"	800	800	2.5	57	2.5	57	N/D	44	1 1/2	28	N/D	184	N/D	272	228
36"	900	900	2.5	60	2.5	60	N/D	48	1 1/2	32	N/D	190	N/D	286	238
40"	1000	1000	2.5	65	2.5	64	N/D	52	1 1/2	36	N/D	200	N/D	302	251

STANDARD FLANGED FITTINGS

Reference Chart for Dual Laminate Fittings in Accordance with Plastic Lined Steel Fittings
Dimensions of Flange in compliance to ANSI B16.1 or 16.5



Size		90° Elbow, Tee		45° Elbow	
		Reduced Tee			
Inch		A		B	
inch	mm	inch	mm	inch	mm
1	25	3.5	89	1.75	44
1.5	40	4	102	2.25	57
2	50	4.5	114	2.5	64
3	80	5.5	140	3	76
4	100	6.5	165	4	102
6	150	8	203	5	127
8	200	9	229	5.5	140
10	250	11	279	6.5	165
12	300	12	305	7.5	191

Major Size		Minor Size		Concentric Reducer	
				Eccentric Reducer	
				C	
inch	mm	inch	mm	inch	mm
1	25	0.5	13	4.5	114
1.5	40	1	25	4.5	114
2	50	1	25	5	127
		1.5	40		
3	80	1	25	6	152
		1.5	40		
		2	50		
4	100	1	25	7	178
		1.5	40		
		2	50		
		3	80		
6	150	1	25	9	229
		1.5	40		
		2	50		
		3	80		
		4	100		
8	200	1	25	11	279
		1.5	40		
		2	50		
		3	80		
		4	100		
		6	150		
10	250	4	100	12	305
		6	150		
		8	200		
12	300	4	100	14	356
		6	150		
		8	200		
		10	250		