Specification Manual

Steel Mesh Reinforced PE Pipe

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Ⅰ Steel Mesh Reinforced PE Pipe Performance and Applications

1.1 Structure

Steel Mesh Reinforced PE Pipe (fitting) is a kind of new composite pipe, which composited the advantage of steel material and thermoplastic plastic, and occupies excellent combination property. Steel and PE is composited by structure composite method.

The twining and welded tube shape steel mesh is as the reinforced part of the whole PE pipe in the middle. The thin steel plate, which is rolled up and welded into tube shape after uniformly punching, is as the reinforced part of the fitting (See Figure 1.1 and 1.2).

There are two connection types for the pipeline: electro-fusion connection and flange connection, and the connection strength are not lower than the pipeline itself (see Figure 1.3 and 1.4).

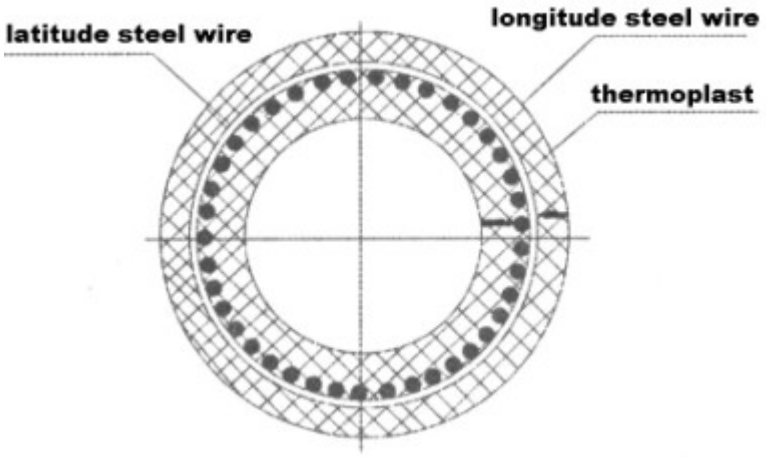


Figure 1.1 section drawing of Steel mesh reinforced PE pipe and fitting

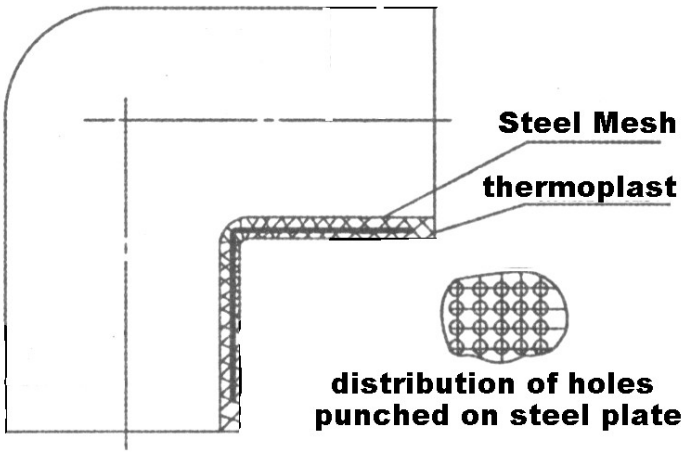


Figure 1.2 fitting structure drawing

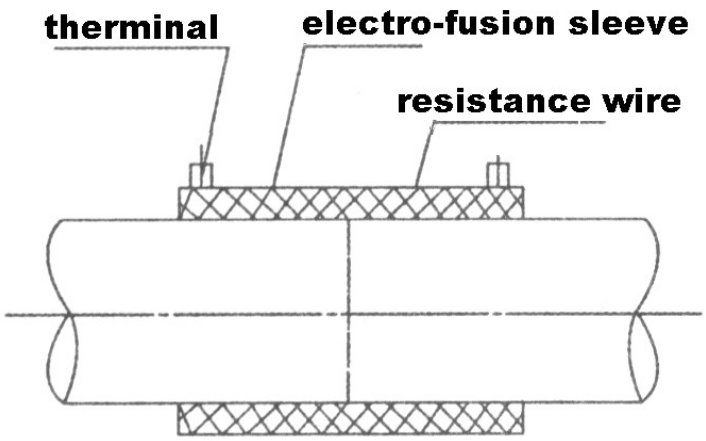


Figure 1.3 electro fusion connection

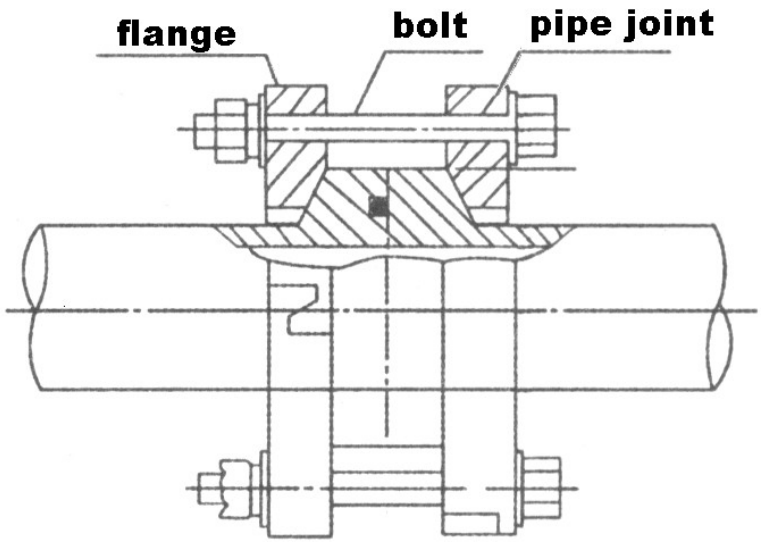


Figure 1.4 flange connection

1.2 Performance

Steel Mesh Reinforced PE Pipe occupies the same performance as PE pipe, like anti-corrosion, no-scale, smother and lower resistance, heat preservation, no condensing, anti-abrasion and light, besides the special structure lead the following other features:

(1) Good creep resistance, long time high mechanical strength

As under normal temperature and stress PE will creep, and under high long time stress PE will brittle fracture, the allowable stress and loading capacity of pure PE pipe is low. However, the mechanical strength of steel is about 10 times of that of HDPE, and quite steady while working under PE working

temperature range, and no creep. Composited the steel mesh and PE, the steel mesh can restrain the creep of PE, and much increased the stress resistance of PE, so the allowable stress of Steel Mesh Reinforced PE Pipe is mush increased while compared with PE pipe.

(2)Good Temperature Performance

The strength of PE pipe is reducing by the raising of working temperature within the temperature range, which is every 10℃ raised with 10% strength reduced. As 2/3 strength is beard by the steel mesh of Steel Mesh Reinforced PE Pipe, so the strength variation by the raising of working temperature is much lower than that of pure PE pipe. The test result showed that for Steel Mesh Reinforced PE Pipe, every 10℃ raised with less than 5% strength reduced.

(3) Good rigidity, shock resistance, dimension stability, and moderate flexibility, tamper force with mercy

The elasticity modulus of steel is 200 times as HDPE. Because of the reinforced affect by steel mesh, the rigidity, shock resistance, and dimension stability of Steel Mesh Reinforced PE Pipe is superior to pure PE pipe. Meanwhile, as the flexible structure of steel mesh, the pipe also occupies axial flexibility. So the pipe occupies tamper force with mercy, which makes good adaptability and operational reliability performance on handing, transportation and installation. Saving support quantities and cost when installing on ground, bearing the accidental shock load by settlement, slippage and vehicles when installing underground. Middle and small diameter pipe can layout by the relief terrain through appropriate bending, which saves lot of fittings.

(4) Small coefficient of thermal expansion

As the coefficient of linear expansion for normal carbon steel wire is $10.6\sim12.2\times10^{-6}$(1/℃), and that of PE is 170×10^{-6}(1/℃), the coefficient of thermal expansion of Steel Mesh Reinforced PE Pipe is much improved by the constraint of netware steel mesh, and lower than normal PE pipe. According to the test, the coefficient of linear expansion for Steel Mesh Reinforced PE Pipe is $35.4\sim35.9\times10^{-6}$(1/℃), which is 3 to 3.4 times of normal carbon pipe. The testing record indicated that, normally, thermal compensator is not required while buried installation, pipe installed sinuously will play the effect of absorption or expansion, and save the installation cost.

(5) Resistance to rapid crack

For the pure PE pipe, especially for big diameter pure PE pipe, while under long time hoop stress, rapid crack (more than hundreds of meters in moment) will easily happened by accidental external load, local flaw, and concentrating stress. So there is a high requirement on the rapid crack resistance performance of PE in international nowadays.

Because of the presence of steel mesh, the deformation and stress of the PE cannot reach the critical point of rapid crack. Whether by theory or actually test, it is proved that rapid crack didn't happen on Steel Mesh Reinforced PE Pipe

(6) Uniform and safety of steel and PE composition

Nowadays, the steel and plastic composited pipe in market is continuous normative interface composite,

and under long term effect of alternating stress, it is easily to delaminating, leaking in connection point, bottleneck shrinking inside, and choking medium flowing.
However, the steel mesh inside of Steel Mesh Reinforced PE Pipe is net structure, which leads steel wire and PE mixed with each other and combined into a while part. The composition surface is big and irregular, the constraining force of two materials is strong and balance, stress concentration is small, which will avoid delaminating.

(7) Two surfaces anti-corrosion

Steel mesh is composited inside of the PE, and leads the inner and outer surfaces of the pipe occupies the same performance of anti-corrosion, anti-abrasion, lower resistance, no-scale, no-paraffin, obvious energy effect. I t is very economical and convenient to install the pipes underground and under corrosive environment condition.

(8) Good traceability

Because of the presence of steel mesh, the Steel Mesh Reinforced PE Pipe buried underground can be detected by normal magnetic detector, incase damaged by other digging engineering, which is the most possible damage reason for normal PE pipe and other non-metal pipe.

(9) Convenient and flexible on modulation of Structure performance

By modulating the structure and performance by change the steel wire diameter, strength, space between mesh, PE thickness to meet different requirements on pressure, temperature, anti-corrosion.

(10) Low production cost, high effective cost, strong market competition power

Material cost is the main part of the pipe cost. The price of steel is around 1/3 of PE, and the Steel Mesh Reinforced PE Pipe consumption radio of steel and PE is around 1.2:1, so the production cost for bigger diameter Steel Mesh Reinforced PE Pipe is lower than the same function PE pipe, and occupies stronger market competition power.

The above features made Steel Mesh Reinforced PE Pipe superior safe reliability and Economical Efficiency. It not only meets the requirements of the applications of normal PE pipe, but also meets the requirements on various industries, and replacing stainless steel and other steel anti-corrosion pipe.

1.3 Applications

(1) Oil field: oil gathering, sewage, crude oil, product oil, polymer for well, brine treatment, especially for high sulphureous oil, gas, water and other medium.
(2) Civil building: water feed and drainage, conveyance of natural gas and coal gas.
(3) Shipping: shipping sewage pipeline, feed and drainage pipeline, ballasting water pipeline and other structure pipe series and living pipe series.
(4) Coal mine: conveyance of coal water slurry, coal bed methane, and coal ash.
(5) Mine: conveyance of ore pulp, engineered well casing, pumping.
(6) Others: metallurgy, nonferrous metals, power, potable industries.

Ⅱ Steel Mesh Reinforced PE Pipe and Fitting Raw Material Performance Requirements

2.1 steel mesh performance requirements

(1) Steel wire requirement

General use low carbon steel wire of SZ zinc coated or copper coated is chose for steel mesh. It can be changed into superior low carbon alloy steel or structural steel wire according to requirement.

Steel wire specification, diameter deviation and performance: tensile strength of parallel steel wire is not smaller than 400Mpa; The steel wire below Φ3.0 (including Φ3.0) must not have any bending with a radius of less than 30mm; the steel wire above Φ3.0 must not have any bending with a radius of less than 60mm. Other dimensions and performance shall be in accordance with YB/T 5294-2009.

(2) Low carbon steel plate

The low carbon steel plate for steel mesh should according to the general low carbon thin steel plate of GB/T 709-2006 standard.

(3)The surface of steel wire should coated by zinc or copper. The coating should be uniform, no slough, no skip coating. The surface of coating should be smooth, neat, without dirt like oil stain and dust accumulation.

2.2 polyethylene (PE) performance requirements

(1)PE material

The PE for the pipe must be the special PE material after premixing, and should meet the requirements in below Table 2.1.

Table 2.1 basic performance of PE

Item	performance requirements
density/(kg/m^3)	≥930
moisture content /(mg/kg)	＜300
volatile content /(mg/kg)	＜350
carbon black content/(%)	2.0~2.5
thermal stability(200℃)/min	＞20
ESCR (environmental stress crack resistance) (100℃, 100%, F_0)/h	≥1000
resistance to gas composition (80℃, 2MPa)/h	≥30
LTHS (long term hydrostatic strength)(20℃,50 years 95%)/MPa	≥8.0
Notes: the carbon black content is only applicable to black pipes, and the resistance to gas composition is only applicable to fuel gas pipes.	

(2)PE recycled material

According to the chemical industry standard (HG standard), the oddments, which can made into up-to-standard products, can be penetrated by less than 5% contents into fresh material for re-use after crushing or re-prilling.

Ⅲ Steel Mesh Reinforced PE Pipe Specification

3.1 Steel Mesh Reinforced PE Pipe Specification

Nominal inner diameter is from DN 50 to DN 600. Nominal pressure classified into five series, PN1.0, PN1.6, PN2.0, PN2.5 and PN4.0. The nominal inner diameter, dimensional deviation of wall thickness of the pipe and the distance from the steel wire to the inner and outer walls are indicated in below Table 3.1.

Table 3.1 Steel Mesh Reinforced PE Pipe Specifications

Nominal pressure PN/MPa	Nominal inner diameter DN /mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600
	allowable relative deviation/%	±1						±0.8			±0.5				
1.0	wall thickness	10.6 +1.6 0	10.6 +1.6 0	11.7 +1.8 0	11.7 +1.4 0	11.8 +1.5 0	12.0 +1.8 0	12.0 +1.8 0	12.0 +1.8 0	12.0 +1.9 0	15.0 +2.4 0	15.0 +2.4 0	15.5 +2.6 0	15.0 +2.6 0	19.0 +3.0 0
	weight/(kg/m)	3.2	4.3	5.5	6.7	8.3	9.5	13	15.7	20.5	30.7	34.3	42.5	47.6	
1.6	wall thickness/mm	10.6 +1.6 0	10.6 +1.6 0	11.7 +1.8 0	11.7 +1.4 0	11.8 +1.5 0	12.0 +1.8 0	12.0 +1.8 0	12.5 +1.9 0	12.5 +1.9 0	15.0 +2.4 0	15.0 +2.4 0	16.0 +2.6 0	16.0 +2.6 0	20.0 +3.0 0
	weight/(kg/m)								16.8	21.3	32	37	46.8	50.5	
2.0	wall thickness/mm	10.6 +1.6 0	10.6 +1.6 0	11.7 +1.8 0	11.7 +1.4 0	11.8 +1.5 0	12.0 +1.8 0	12.5 +1.9 0	13.0 +2.0 0	14.5 +2.2 0	15.5 +2.6 0	15.5 +2.6 0	16.5 +2.6 0	16.5 +2.6 0	
	weight/(kg/m)														
2.5	wall thickness/mm	10.6 +1.6 0	10.6 +1.6 0	11.7 +1.8 0	11.7 +1.4 0	11.8 +1.5 0	12.5 +1.9 0	12.5 +1.9 0	13.0 +2.0 0						
	weight/(kg/m)						10.4								
4.0	wall thickness/mm	10.6 +1.6 0	10.6 +1.6 0	11.7 +1.8 0	12.2 +1.8 0	12.3 +1.8 0	15.5 +2.6 0								
	weight/(kg/m)														
Distance between steel wires to wall /mm		≥2.0						≥2.5			≥3.0				

Notes: Nominal pressure refers to the allowable highest pressure while estimate lifetime of pipe is 50 years; transporting medium is 20℃ and chemically stable for the PE.

The pipe body refers to the part of the pipe bearing all the internal pressure.

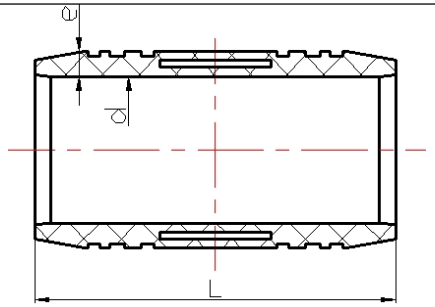
The dimensions of the pipe end of socket or flange joint structures shall be determined upon the requirement of connection, but its wall thickness shall not be less than 95% of that of the body.

3.2 Steel Mesh Reinforced PE Pipefitting specification

(1) Electro-fusion sleeve

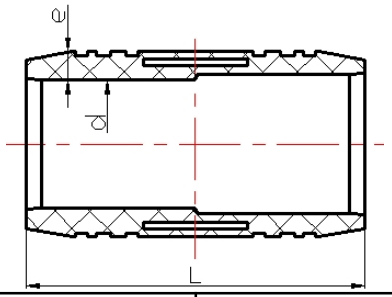
The fitting of two coaxial mouthing and resistance wire pre-casted in wall of mouthing is called electro-fusion sleeve. According to the different structure of mouthing, electro-fusion sleeve is divided into electro-fusion sleeve and transition electro-fusion sleeve. The two ends mouthing of electro-fusion sleeve is the same, while the structure of diameter of the two ends mouthing of transition electro-fusion sleeve is not the same, one is plain end and another is tapered end. See Table 3.2 and 3.3 for basic data of electro-fusion sleeve.

Table 3.2 electro-fusion sleeve basic data

electro-fusion sleeve drawing															
Nominal inner diameter DN/mm		50	65	80	100	125	150	200	250	300	350	400	450	500	600
Pressure/MPa		1.0, 1.6, 2.0, 2.5, 4.0						1.0, 1.6, 2.0							1.0, 1.6
fusion area inner hole d /mm	basic dimension/mm	70.5	86.5	102.5	123	147	172.5	223.5	273.5	324.5	395	448	500	547	642
	average deviation/mm	±0.8	±0.8	±1.0	±1.0	±1.0	±1.0	±1.5	±1.5	±1.5	±2.0	±2.0	±2.0	±3.0	±1.0
wall thickness e /mm	basic dimension/mm	16	16	17	17	17	17	17	18	18	17	17	18	18	22
	average deviation/mm	±0.8	±0.8	±0.8	±0.8	±0.8	±0.8	±0.8	±1.0	±1.0	±1.5	±1.5	±1.5	±1.5	±1.5
L/mm		148.0 ±2.0	148.0± 2.0	168.0 ±2.0	178.0 ±2.0	198.0 ±2.0	218.0 ±2.0	238.0 ±2.0	257.0 ±2.0	297.0 ±2.0	315.0 ±2.0	334.0 ±2.0	354.0 ±2.0	373.0 ±3.0	510.0 +5 -2
weight/kg		0.6	0.95	1.25	1.65	2.2	2.7	3.75	5.3	7.4	10.0	11.8	15.0	17.6	

Notes: DN50-300 electro-fusion sleeve mouthing is plain end structure; DN350-600 electro-fusion sleeve mouthing is tapered structure.

Table 3.3 transition electro-fusion sleeve basic data

electro-fusion sleeve drawing									
Nominal inner diameter DN/mm		350		400		450		500	
		big end	small end	big end	small end	big end	small end	big end	small end
Pressure/MPa		1.0, 1.6, 2.0							
fusion area inner hole d & deviation/mm	basic dimension/mm	395.0	383.0	448.0	432.5	500.0	482.5	547.0	530.0
	average deviation/mm	±2.0	±2.0	±2.0	±2.0	±2.0	±2.0	±3.0	±2.0
wall thickness e/mm	basic dimension/mm	17	21.5	17	21.5	18	23	18	26.5
	average deviation/mm	±1.5	+3.0 -1.5	±1.5	+3.0 -1.5	±1.5	+3.0 -1.5	±1.5	+3.0 -1.5
length/mm		315.0±2.0		334.0±2.0		354.0±2.0		373.0±3.0	
weight/kg		10.8		12.7		16.0		19.1	

Notes: transition electro-fusion sleeve “big end” mouthing is tapered structure; “small end” mouthing is plain end structure.

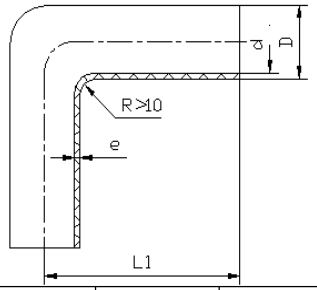
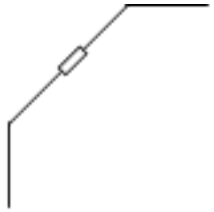
(2) Elbow

There are 4 kinds of standard elbow, including 11.25°, 22.5°, 45°, and 90°.

The two ends of the elbows can be flange connection structure, plain end structure and Tapered end structure according to the connection requirement.

The processing type of elbow is indicated by the letter code of two end types, eg if one end of elbow is electro-fusion sleeve connection type, and another end is electro-fusion sleeve, it can be indicated " DF" 90°, 45°, 22.5°, 11.25°. See Table 3.4-3.7 for elbow basic data.

Table 3.4 90°Elbow basic data

90°Elbow drawing											assembling unit, 2pc of 45° assembled 				
Nominal inner diameter DN/mm			50	65	80	100	125	150	200	250	300	350	400	450	500	600
fusion area inner hole d /mm	basic dimension/mm		50	65	80	100	125	150	200	250	300	343	393	443	495	
	average deviation/mm		±1.0	±1.0	±1.0	±1.0	±1.0	-0.5 -3.5	-1.5 -4.5	-2.0 -6.0	-3.0 -7.0	±2.0	±2.0	±2.0	±2.0	
nominal pressure PN/MPa	1.0	wall thickness/mm	11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	11.0±0.7	12.0±0.8	13.0±0.8	14.0±1.0	14.5±1.5	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	22.0±2.0
	1.6		11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	11.0±0.7	12.0±0.8	13.0±0.8	14.0±1.0	14.5±1.5	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	24.0±2.0
	2.0		11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	11.0±0.7	12.0±0.8	13.0±0.8	14.0±1.0	14.5±1.5	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	
	2.5		11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	12.0±0.7	12.5±0.8	13.0±1.0	14.0±1.0						
	4.0		11.0±0.5	11.0±0.5	11.5±0.6	12.0±1.0	12.5±1.2	16.0±1.2								
lengthL1/mm			150.0±2.0	160.0±2.0	180.0±2.0	190.0±2.0	200.0±2.0	225.0±2.0	278.0±2.0	335.0±2.0	380.0±2.0	797	845	893	941	460
weight/kg			1.2	1.6	2.5	3.2	4.0	5.4	9.0	16.2	23.1					

For DN50-300, if one end or two ends of fitting is flange connection, the length L1 add 10 or 20mm; for DN350-DN600, it is assembled by same specification of 45°Elbow and electro-fusion sleeve assembled.

Table 3.5 45°Elbow basic data

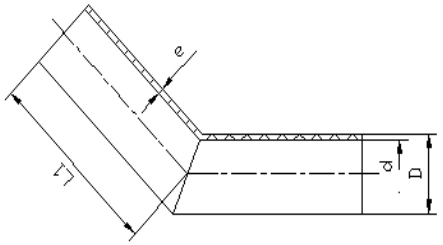
45°Elbow drawing															
Nominal inner diameter DN/mm			50	65	80	100	125	150	200	250	300	350	400	450	500	600
fusion area inner hole d /mm	basic dimension/mm		50	65	80	100	125	150	200	250	300	343	393	443	495	
	average deviation/mm		±1.0	±1.0	±1.0	±1.0	±1.0	-0.5 -3.5	-1.5 -4.5	-2.0 -6.0	-3.0 -7.0	±2.0	±2.0	±2.0	±2.0	
nominal pressure PN/MPa	1.0	wall thickness/mm	11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	11.0±0.7	12.0±0.8	13.0±0.8	14.0±1.0	14.5±1.5	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	22.0±2.0
	1.6		11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	11.0±0.7	12.0±0.8	13.0±0.8	14.0±1.0	14.5±1.5	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	24.0±2.0
	2.0		11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	11.0±0.7	12.0±0.8	13.0±0.8	14.0±1.0	14.5±1.5	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	
	2.5		11.0±0.5	11.0±0.5	11.5±0.6	11.5±0.6	12.0±0.7	12.5±0.8	13.0±1.0	14.0±1.0						
	4.0		11.0±0.5	11.0±0.5	11.5±0.6	12.0±1.0	12.5±1.2	16.0±1.2								
lengthL1/mm			110.0±2.0	125.0±2.0	145.0±2.0	140.0±2.0	160.0±2.0	170.0±2.0	185.0±2.0	215.0±2.0	240.0±2.0	330.0±2.0	350.0±2.0	370.0±2.0	390.0±2.0	460
weight/kg			0.9	1.3	2.1	2.6	3.2	4.6	6.0	10.0	14.0	23.1				
For DN50-300, if one end or two ends of fitting is flange connection, the length L1 add 10 or 20mm																

Table 3.6 22.5°Elbow basic data

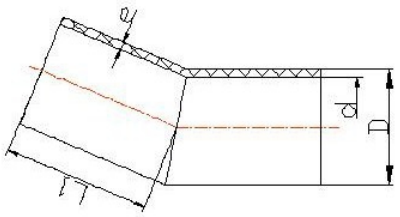
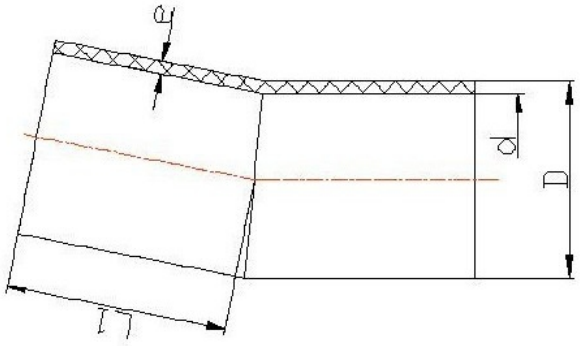
22.5°Elbow drawing					
Nominal inner diameter DN/mm		200	300	400	500
Pressure/MPa		1.0, 1.6, 2.0, 2.5	1.0, 1.6, 2.0		
inner diameter d/mm	basic dimension/mm	200.0	300.0	400.0	495
	limit deviation/mm	-1.5 -4.5	-3.0 -7.0	-3.0 -7.0	±2.0
nominal wall thickness e/mm	basic dimension/mm	13	14.5	18	23
	limit deviation/mm	±0.8	±1.5	±1.5	±1.0
L1/mm		185.0±2.0	240.0±2.0	340.0±2.0	380.0±2.0
minimum outer diameter D(mm)		223.5	323.5		
weight/kg		6.1	13.6	34.5	55.8
DN200-300, if one end or two ends of fitting is flange connection, the length L1 add 10 or 20mm					

Table 3.7 11.25°Elbow basic data

11.25°Elbow drawing		
Nominal inner diameter DN/mm		500
Pressure/MPa		1.0, 1.6, 2.0
inner diameter d/mm	basic dimension/mm	495
	limit deviation/mm	±2.0
nominal wall thickness e/mm	basic dimension/mm	23
	limit deviation/mm	±1.0
L1/mm		380.0±2.0
minimum outer diameter D/mm		542.4
weight/kg		55

(3) Tee

There are two kinds of tee, straight tee and reducing tee. Reducing tee included molded tee and assembling tee. The end can be flange connection structure, plain end structure and Tapered end structure according to the connection requirement. The processing type is indicated by the letter code of every end type, eg, if the Horizontal end is electro-fusion sleeve connection type, and vertical end is flange connection type, it can be indicated “DFD”, and the middle code refers to the branch structure. See Table 3.11 and 3.12 for tee data.

Table 3.8 straight tee basic data

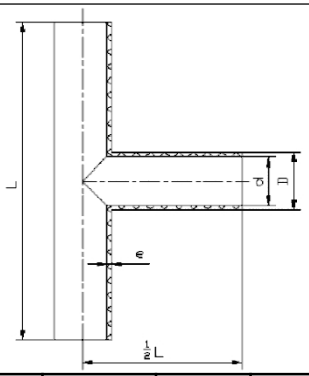
straight tee drawing														
Nominal inner diameter DN/mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Pressure/MPa	1.0, 1.6, 2.0, 2.5, 4.0			1.0, 1.6, 2.0, 2.5, 4.0			1.0, 1.6, 2.0							1.0, 1.6
inner diameter d / mm — basic dimension	50	65	80	100	125	150	200	250	300	343	393	443	495	
inner diameter d / mm — average deviation	±1.0	±1.0	±1.0	±1.0	±1.0	-0.5 -3.5	-1.5 -4.5	-2.0 -6.0	-3.0 -7.0	±2.0	±2.0	±2.0	±2.0	
wall thickness e/mm — basic dimension	11	11	11.5	11.5	12	12	13	14	14.5	18	18	18	18	22
wall thickness e/mm — average deviation	±0.8	±0.8	±0.6	±0.6	±0.8	±0.8	±0.8	±1.0	±1.5	±1.0	±1.0	±1.0	±1.0	±2.0
Length L/mm	300±2.0	320±2.0	360±2.0	380±2.0	400±2.0	450±2.0	510±2.0	600±2.0	670±2.0	880±2.0	950±2.0	1020±2.0	1090±2.0	1300
minimum outer diameter /mm	71.5	86.5	102.5	122.5	147.5	173.5	223.5	273.5	323.5					
weight /kg	1.6	2.1	3.4	4.2	5	6.8	10.4	17.4	23.3	38.9	54.7	65	75	
Notes: for DN50-300, if one end or two ends of fitting is flange connection, the length L1 add 10 or 20mm														

Table 3.9 reducing tee basic data

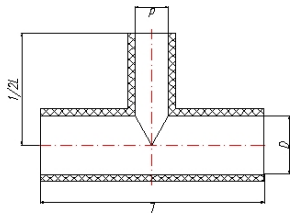
reducing tee									
specification/mm		65/50	80/50	80/65	100/50	100/65	100/80	150/50	150/100
Pressure/MPa		1.0, 1.6, 2.0, 2.5, 4.0							
big end/mm	inner diameter basic dimension	65	80		100			150	
	average deviation	±1.0	±1.0		±1.0			-0.5 -3.5	
	wall thickness	11.0±0.8	11.5±0.6		11.5±0.6			12.0±0.8	
	minimum outer diameter	86.5	102.5		122.5			173.5	
small end/mm	inner diameter basic dimension	50	50	65	50	65	80	50	100
	average deviation	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
	wall thickness	11±0.8	11±0.8	11±0.8	11±0.8	11±0.8	11.5±0.6	11±0.8	11.5±0.6
	minimum outer diameter	71.5	71.5	86.5	71.5	86.5	102.5	71.5	122.5
L/mm		320.0±2.0	360.0±2.0		380.0±2.0			450.0±2.0	
weight/kg		2	2.9	3.0	3.6	3.7	4.0	5.8	6.3

Table 3.9(continue) reducing tee basic data

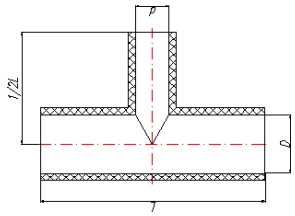
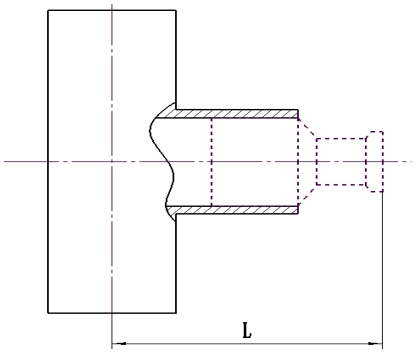
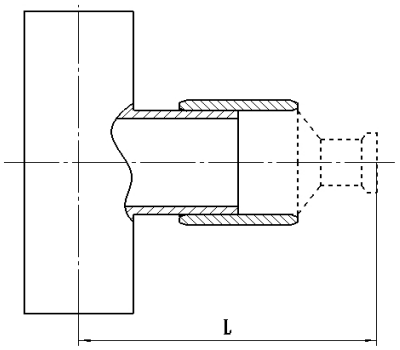
reducing tee											
specification/mm		200/50	200/100	200/150	250/100	250/150	250/200	300/100	300/150	300/200	300/250
Pressure/MPa		1.0, 1.6, 2.0, 2.5						1.0, 1.6, 2.0			
big end/mm	inner diameter basic dimension	200			250			300			
	average deviation	-1.5 -4.5			-2.0 -6.0			-3.0 -7.0			
	wall thickness	13.0±0.8			14.0±1.0			14.5±1.5			
	minimum outer diameter	223.5			273.5			323.5			
small end/mm	inner diameter basic dimension	50	100	150	100	150	200	100	150	200	250
	average deviation	±1.0	±1.0	-0.5 -3.5	±1.0	-0.5 -3.5	-1.5 -4.5	±1.0	-0.5 -3.5	-1.5 -4.5	-2.0 -6.0
	wall thickness	11±0.8	11.5±0.6	12±0.8	11.5±0.6	12±0.8	13±0.8	11.5±0.6	12.0±0.8	13.0±0.8	14.0±1.0
	minimum outer diameter	71.5	122.5	173.5	122.5	173.5	223.5	122.5	173.5	223.5	273.5
L/mm		510.0±2.0			600.0±2.0			670.0±2.0			
weight/kg		8.8	9.4	10.0	15.5	15.3	16.1	20.0	20.3	20.3	21.8
Notes: for DN50-300, if one end or two ends of fitting is flange connection, the length L1 add 10 or 20mm											

Table 3.10 assembling tee basic data

Item	Pressure/MPa	specification	L/(mm)	weight (kg)	series		specification	L/(mm)	weight (kg)
DN150	1.0, 1.6, 2.0, 2.5, 4.0	150/65	605±10	26.1	DN400	1.0, 1.6, 2.0	400/150	730±10	79.5
		150/80	605±10	25.9			400/200	710±10	78.3
		150/125	605±10	25.5			400/250	700±10	76.0
DN200	1.0, 1.6, 2.0, 2.5	200/65	535±10	25.6			400/300	765±10	75.4
		200/80	535±10	25.8			400/350	1025±10	91.1
		200/125	705±10	25.9	DN450		450/50	790±10	97.7
DN250		250/50	465±10	36.3			450/65	790±10	98.0
		250/65	465±10	35.8			450/80	790±10	98.2
		250/80	465±10	35.7			450/100	780±10	98.2
		250/125	495±10	33.8			450/125	770±10	98.0
DN300	1.0, 1.6, 2.0	300/50	480±10	36.1			450/150	770±10	97.5
		300/65	480±10	36.2			450/200	750±10	96.2
		300/80	480±10	36.3			450/250	740±10	93.8
		300/125	520±10	36.5			450/300	795±10	92.9
DN350		350/50	710±10	57.4			450/350	890±15	95.8
		350/65	710±10	57.6			450/400	1110±15	109.6
		350/80	710±10	57.9	DN500		500/50	830±10	116.9
		350/100	705±10	57.9			500/65	830±10	117.2
		350/125	695±10	57.7			500/80	830±10	117.4
		350/150	695±10	57.3			500/100	815±10	117.3
		350/200	680±10	56.3			500/125	815±10	117.2
		350/250	665±10	54.1			500/150	815±10	116.7
		350/300	890±10	64.4			500/200	785±10	115.2
DN400		400/50	750±10	79.6			500/250	775±10	112.7
		400/65	750±10	79.9			500/300	830±15	111.6
		400/80	750±10	80.1			500/350	925±15	114.4
		400/100	740±10	80.1			500/400	965±15	112.0
		400/125	730±10	79.9			500/450	1200±15	131.4

drawing	
 Inset electro-fusion assembling tee	 reducer assembling tee

Notes:
1.DN500/450, DN450/400, DN400/350, DN350/300, DN200/65, DN200/80 is " reducer assembling tee" , others are "inset electro-fusion assembling tee" .
2. L is the dimension of vertical end electro-fusion sleeve connection or flange connection.
3.For DN200/125, DN150/65, DN150/80 and DN150/125 assembling tee, while vertical end is electro-fusion sleeve connection, the value of L is 10mm less than in the table.

(4) Reducer

Reducer divided into two kind of molding: one-time-molding and molding after twining. The end of the fitting can be electro-fusion end or flange connection structure according to connecting requirement. The connection dimension is same to the related fitting end. The fitting end type is indicating by letter code of end structure type, eg,if big end is electro-fusion connection, and small end is flange connection, it can be indicated “DF”, and the letter code of big end is in front. See Table 3.11 and 3.12 for fitting data.

Table 3.11 reducer basic data

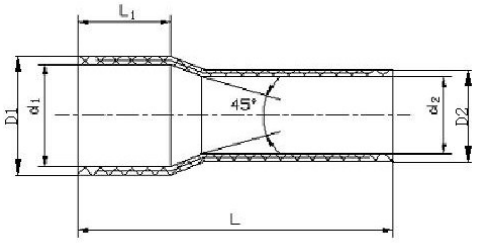
reducer (DD)												
Specification DN/mm		500/400	400/300	300/250	300/200	300/150	250/200	250/150	250/125	200/150	200/125	200/100
Pressure/MPa		1.0, 1.6, 2.0					1.0, 1.6, 2.0, 2.5					
big end/mm	inner diameter basic dimension	495	393	300			250			200		
	average deviation	±2.0	±2.0	-3.0 -7.0			-2.0 -6.0			-1.5 -4.5		
	wall thickness	18.0±1.0	18.0±1.0	14.5±1.5			14.0±1.0			13.0±0.8		
	minimum outer diameter			323.5			273.5			223.5		
small end/mm	inner diameter basic dimension	393	300	250	200	150	200	150	125	150	125	100
	average deviation	±2.0	-3.0 -7.0	-2.0 -6.0	-1.5 -4.5	-0.5 -3.5	-1.5 -4.5	-0.5 -3.5	±1.0	-0.5 -3.5	±1.0	±1.0
	wall thickness	18.0±1.0	14.5±1.5	14.0±1.0	13.0±0.8	12.0±0.8	13.0±0.8	12.0±0.8	12.0±0.8	12.0±0.8	12.0±0.8	11.5±0.6
	minimum outer diameter		323.5	273.5	223.5	173.5	223.5	173.5	147.5	173.5	147.5	122.5
L/mm		800.0±2.0	720.0±2.0	500.0±2.0			500.0±2.0			450.0±2.0		
weight/kg		45.7	27.8	12.7	11	10.7	9.7	9.1	8	6.4	5.8	5.6

Table 3.11(continue) reducer basic data

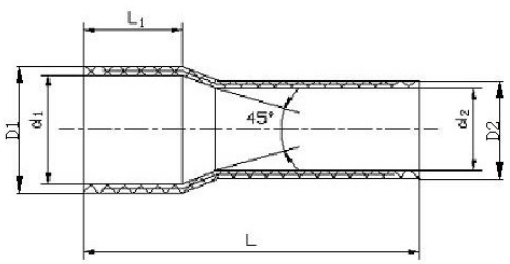
reducer drawing(DD)															
Specification DN/mm		150/125	150/100	150/80	150/65	150/50	125/100	125/80	125/65	125/50	100/80	100/65	100/50	80/65	80/50
Pressure/MPa		1.0, 1.6, 2.0, 2.5, 4.0													
big end/mm	inner diameter basic dimension	150					125				100			80	
	average deviation	-0.5 -3.5					±1.0				±1.0			±1.0	
	wall thickness	12.0±0.8					12.0±0.8				11.5±0.6			11.5±0.6	
	minimum outer diameter	173.5					147.5				122.5			102.5	
	inner diameter basic dimension	125	100	80	65	50	100	80	65	50	80	65	50	65	50
small end/mm	average deviation	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
	wall thickness	12.0±0.8	11.5±0.6	11.5±0.6	11.0±0.8	11.0±0.8	11.5±0.6	11.5±0.6	11.0±0.8	11.0±0.8	11.5±0.6	11.0±0.8	11.0±0.8	11.0±0.8	11.0±0.8
	minimum outer diameter	147.5	122.5	102.5	86.5	71.5	122.5	102.5	86.5	71.5	102.5	86.5	71.5	86.5	71.5
L/mm		380.0±2.0					360.0±2.0				340.0±2.0			300.0±2.0	
weight/kg		4.5	4.1	4	3.8	3.6	3.4	3.2	3	2.8	2.7	2.3	2.2	1.9	1.8
Notes: for DN50-300, if one end or two ends of fitting is flange connection, the length L1 add 10 or 20mm															

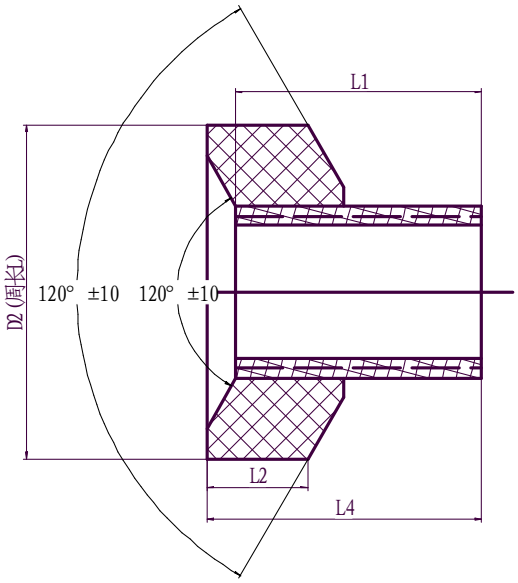
Table 3.12 twining reducer basic data

Nominal inner diameter DN/mm	Pressure/MPa	prefabricate length L1/mm	L4/mm	L2/mm	L(perimeter)/mm
200/50	1.0, 1.6, 2.0, 2.5	250±5	280±10	120＋5	703＋2
200/65		250±5	280±10		
200/80		250±5	280±10		
200/100		300±5	335±10		
200/125		300±5	325±10		
200/150		300±5	325±10		
250/50		250±5	295±10	135＋5	859＋2
250/65		250±5	295±10		
250/80		250±5	295±10		
250/100		300±5	335±10		
250/125		300±5	325±10		
250/150		300±5	325±10		
250/200		380±5	395±10		
300/50	1.0, 1.6, 2.0	250±5	295±10	155＋5	1019＋2
300/65		250±5	295±10		
300/80		250±5	295±10		
300/100		300±5	345±10		
300/125		300±5	335±10		
300/150		300±5	335±10		
300/200		380±5	410±10		
300/250		380±5	400±10		
350/50		380±5	440±10	160＋5	1202＋3
350/65		380±5	440±10		
350/80		380±5	440±10		
350/100		380±5	435±10		
350/125		380±5	425±10		
350/150		380±5	425±10		
350/200		380±5	410±10		
350/250		380±5	395±10		
350/300		450±5	460±10		

Table 3.12(continue) twining reducer basic data

Nominal inner diameter DN/mm	Pressure/MPa	prefabricate lengthL1/mm	L4/mm	L2/mm	L(perimeter)/mm
400/50	1.0, 1.6, 2.0	380±5	455±10	170＋5	1360＋3
400/65		380±5	455±10		
400/80		380±5	455±10		
400/100		380±5	445±10		
400/125		380±5	435±10		
400/150		380±5	435±10		
400/200		380±5	415±10		
400/250		380±5	405±10		
400/300		450±5	470±10		
400/350		550±5	560±10		
450/50		380±5	470±10	180＋5	1522＋3
450/65		380±5	470±10		
450/80		380±5	470±10		
450/100		380±5	460±10		
450/125		380±5	450±10		
450/150		380±5	450±10		
450/200		380±5	430±10		
450/250		380±5	420±10		
450/300		450±5	475±10		
450/350		550±5	570±15		
450/400		600±5	610±15		
500/50		380±5	485±10	190＋5	1682＋3
500/65		380±5	485±10		
500/80		380±5	485±10		
500/100		380±5	470±10		
500/125		380±5	470±10		
500/150		380±5	470±10		
500/200		380±5	440±10		
500/250		380±5	430±10		
500/300		450±5	485±15		
500/350		550±5	580±15		

Table 3.12(continue) twining reducer basic data

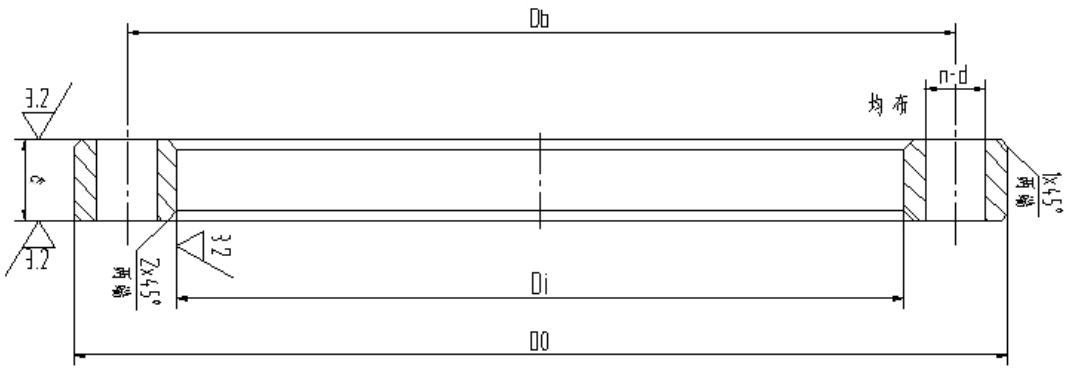
Nominal inner diameter DN/mm	Pressure/MPa	prefabricate lengthL1/mm	L4/mm	L2/mm	L(周长)/mm
DN500/400	1.0, 1.6, 2.0	600±5	620±15	190＋5	1682＋3
DN500/450		650±5	665±15		
twining reducer drawing					

(5) Lap joint flange, bolt specification

Flange and bolt basic data see Table 3.13.

Table 3.13 flange and bolt basic data unit: mm

Flange drawing



Item / specification	outer diameter	inner diameter	distance between holes	thickness	quantity of holes	hole diameter	Length-connecting to same structure pipe	Length-connecting to different structure pipe	Pressure
DN50	160	$98^{+0.6}_{+0.3}$	125	18	4	18	M16*160	M16*110	1.0\1.6\2.5\4.0
DN65	180	$114^{+0.63}_{+0.41}$	145	18	8	18	M16*160	M16*110	1.0\1.6(half)2.5
				22					4.0
DN80	195	$129^{+0.71}_{+0.46}$	160	19	8	18	M16*160	M16*110	1.0\1.6\2.5
				24					4.0
DN100	215	$153^{+0.77}_{+0.52}$	180	19	8	18	M16*170	M16*120	1.0\1.6
	230		190	24		22	M20*180	M20*130	2.5\4.0
DN125	245	$180^{+0.83}_{+0.58}$	210	19	8	18	M16*170	M16*120	1.0\1.6
	265		220	26		26	M24*190	M24*140	2.5
DN150	280	$207^{+1.03}_{+0.74}$	240	21	8	22	M20*170	M20*120	1.0\1.6
	295		250	27		26	M24*190	M24*140	2.5
DN200	335	$258^{+1.24}_{+0.92}$	295	21	8	22	M20*170	M20*120	1.0
				24	12		M20*180	M20*130	1.6
	355		310	28		26	none	M24*140	2.5
DN250	390	$314^{+1.56}_{+1.20}$	350	23	12	22	M20*200	M20*140	1.0
	400		355	28		26	M24*210	M24*150	1.6
	420		370	30		30	none	M27*150	2.5
DN300	440	$364^{+1.71}_{+1.35}$	400	24	12	22	M20*200	M20*140	1.0
	455		410	28		26	M24*210	M24*150	1.6
	480		430	30	16	30	none	M27*150	2.5
DN350	505	$418^{+2.05}_{+1.65}$	460	28	16	22	M20*230	M20*160	1.0
	520		470	30		26	M24*240	M24*160	1.6
DN400	565	$470^{+2.05}_{+1.65}$	515	28	16	26	M24*240	M24*160	1.0
	580		525	34		30	M27*260	M27*180	1.6
DN450	615	$520^{+2.05}_{+1.65}$	565	32	20	26	M24*260	M24*180	1.0
	640		585	38		30	M27*280	M27*200	1.6
DN500	670	$572^{+2.05}_{+1.65}$	620	32	20	26	M24*280	M24*180	1.0
	715		650	42		33	M30*300	M30*210	1.6
DN600	780	685	725	30	20	30	M27*140		1.0
	840	702	770	35		36	M30*180		1.6

Notes:

1. The “Length of connecting to same structure pipe” is the length of bolt, which connecting steel mesh reinforced PE pipe with fitting while connected by flange.

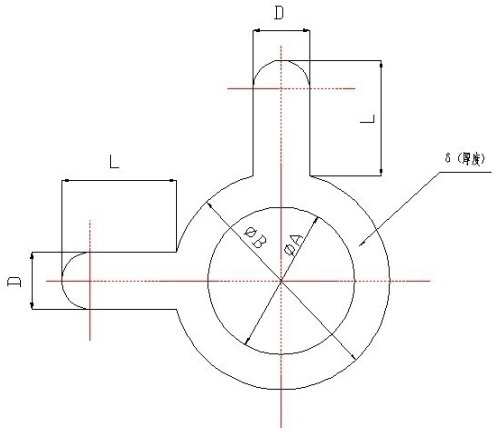
The “Length of connecting to different structure pipe” is the length of bolt, which connecting steel mesh reinforced PE pipe with steel pipe, equipment, or valves while connected by flange.

2. The seal of flange can choose O ring seal or seal gasket.

(6) Sealing gasket specification

Sealing gasket specification data see Table 3.14.

Table 3.14 sealing gasket basic data

sealing gasket drawing													
specification diameter	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300	DN350	DN400	DN450	DN500
A/mm	50^{+1}_{0}	65^{+1}_{0}	80^{+1}_{0}	100^{+2}_{0}	125^{+2}_{0}	150^{+2}_{0}	200^{+3}_{0}	250^{+3}_{0}	300^{+3}_{0}	350^{+4}_{0}	400^{+4}_{0}	450^{+4}_{0}	500^{+4}_{0}
B/mm	97	113	128	152	179	205	256	311	361	416	466	520	570
L/mm	55±2	55±2	55±2	60±2	65±2	70±3	70±3	80±3	80±3	70±3	80±3	80±3	90±3
D/mm	20±2	20±2	20±2	25±2	25±2	25±2	30±2	30±2	30±2	35±2	35±2	40±2	40±2
δ/mm	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2	3±0.2
weight/kg	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.14	0.18	0.22	0.24	0.28	0.32