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Industrial Pipeline Accessories



**HTCO海泰管业**  
**Industrial Pipeline Accessories**  
**工业管路配件**

营口海泰金属管业有限公司  
 Yingkou Haitai Metal and Pipe Fittings Co.,Ltd

Yingkou Haitai Metal and Pipe Fittings Co., Ltd was founded in 2001, located in the traffic convenient sea port Yingkou city of China.

HTCO is one of the pioneer manufacturers specialized in the production of pressure pipeline accessories and our main products include seamless and welded elbow, tee, reducer, cap, bend, forged flange, as well as forged fittings etc. We can also manufacture as per customers' relevant standard requirements and drawings to satisfy the requirements for different materials and pipe fitting specifications in various industries.

HTCO is equipped with strong technical force, advanced production and inspection equipment. With complete quality management system, we can manufacture products according to any standard domestic and overseas and guarantee products quality perfect match standard specifications. We've passed API Q1-8th, PED 97/23/EC, ISO9001:2008 quality management system, TS/ISO 29001 and China Manufacturing License of Special Equipment. We supply large amount of superior products for domestic oil, chemical industry, ship building, oil & gas, electricity power and other related field. At the same time, we own import & export operations right and our products are further sold overseas such as Singapore, Thailand, UK, Korea, etc and deeply praised by customers.

HTCO is based on the principle of Integrity is weightier than Mount Tai to look for serious and long term cooperation relationship with you. We sincerely welcome new and old customers to visit us!



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原材料 Raw Material



下料 Cutting



卷制成型 Rolling Forming



热压制成型 Hot-Press Forming



自动焊接 Automatic Welding



热处理 Heat Treatment



成品 Finished Product



成品 Finished Product



原材料 Raw Material



下料 Cutting



中频加热成型 Intermediate Frequency Hot Forming



中频加热成型 Intermediate Frequency Hot Forming



热处理 Heat Treatment



端部加工 Beveling



成品 Finished Product



成品 Finished Product





弯管推制线 Bend Push Forming Line



弯管推制线 Bend Push Forming Line



弯管推制线 Bend Push Forming Line



产品 Product



产品 Product



产品 Product



产品 Product



原材料 Raw Material



下料 Cutting



锻锤 Forged Hammer



毛坯件 Semi-Finished Product



钻眼 Drilling



立式车床 Vertical Lathe



车床 Lathe Machine



产品 Product



产品 Product



产品 Product





直读光谱仪 Direct-reading Spectrometer



金相显微镜 Metallographic Microscope



自动试压泵&布氏硬度试验机 Electric Pressure Testing Pump & Binnell Tester



SG高温炉 SG High Temperature Furnace



液压式万能试验机 Hydraulic Universal Tester



冲击试验低温箱 Impact Test Container



低温冲击试验机 Low Temperature Impact Testing Machine



检验 Inspection



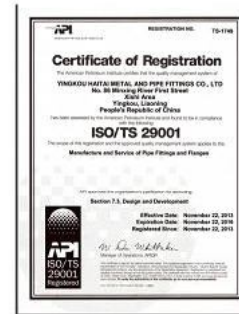
检验 Inspection



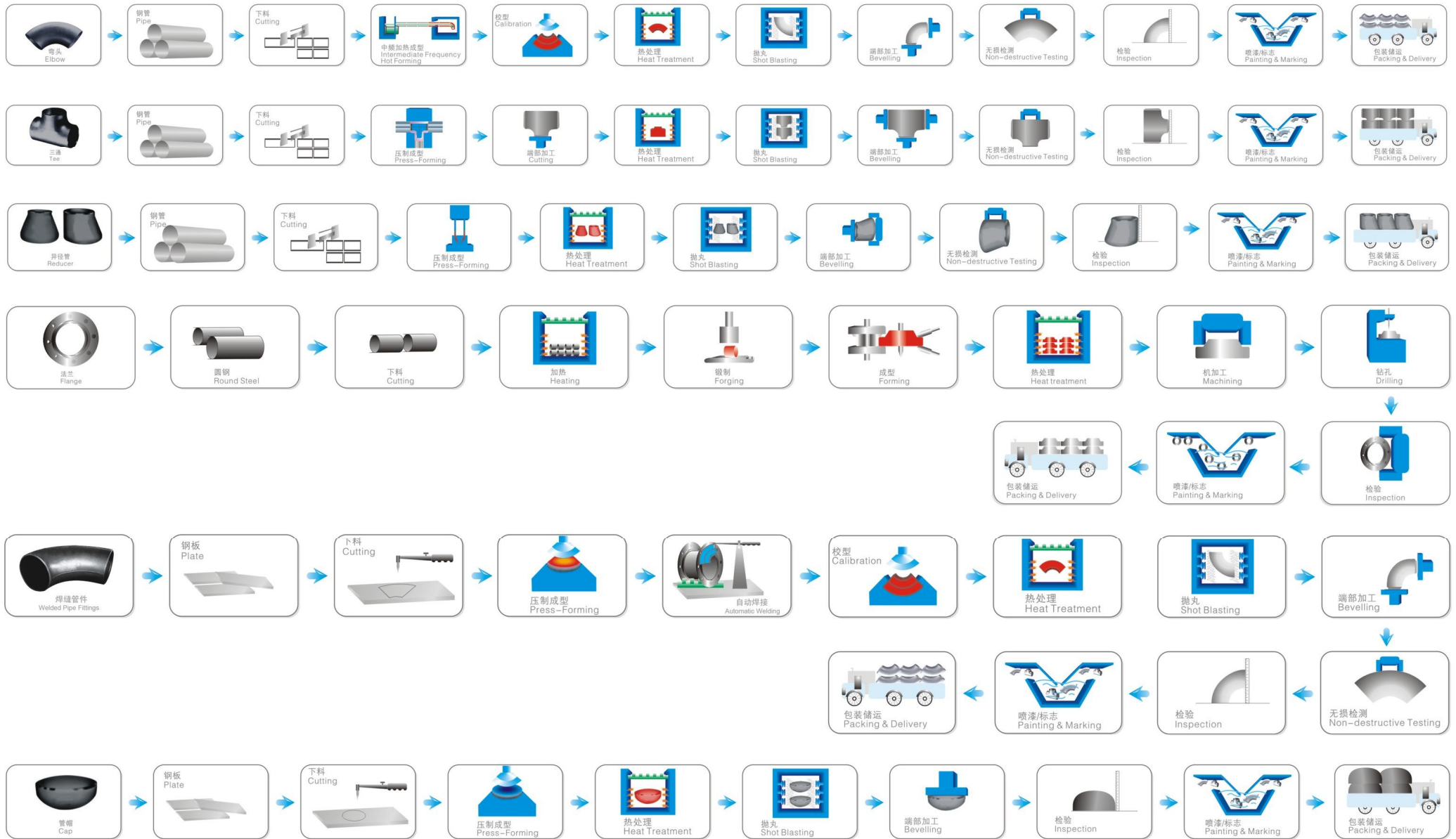
水压试验 Hydraulic Test



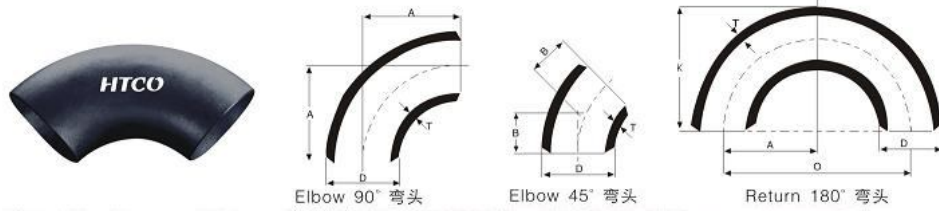
爆破试验 Burst Test





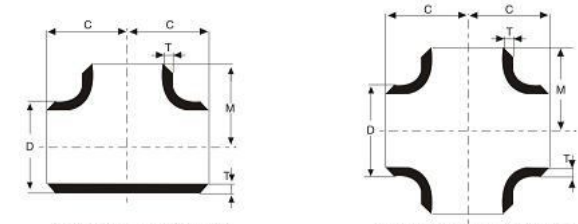






Butt Welding Elbows and Returns 对焊弯头 ASME B16.9-2007 MSS SP-75-2008 Unit:mm

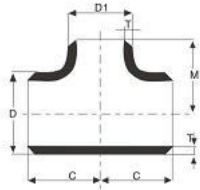
Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径 D	Center to End 中心至端面		Center to Center 中心至中心			Back to Face 背面至端面		
		Elbows 90° 弯头		Elbows 45° 弯头		Return 180° 弯头			
		A		B		O		K	
		Long Radius 长半径	Short Radius 短半径	Long Radius 长半径	Long Radius 长半径	Short Radius 短半径	Long Radius 长半径	Short Radius 短半径	
1/2	21.3	38	-	16	76	-	48	-	
3/4	26.7	38	-	19	76	-	51	-	
1	33.4	38	25	22	76	51	56	41	
1 1/4	42.2	48	32	25	95	64	70	52	
1 1/2	48.3	57	38	29	114	76	83	62	
2	60.3	76	51	35	152	102	106	81	
2 1/2	73.0	95	64	44	190	127	132	100	
3	88.9	114	76	51	229	152	159	121	
3 1/2	101.6	133	89	57	267	178	184	140	
4	114.3	152	102	64	305	203	210	159	
5	141.3	190	127	79	381	254	262	197	
6	168.3	229	152	95	457	305	313	237	
8	219.1	305	203	127	610	406	414	313	
10	273.0	381	254	159	762	508	518	391	
12	323.8	457	305	190	914	610	619	467	
14	355.6	533	356	222	1067	711	711	533	
16	406.4	610	406	254	1219	813	813	610	
18	457	686	457	286	1372	914	914	686	
20	508	762	508	318	1524	1016	1016	762	
22	559	838	559	343	1676	1118	1118	838	
24	610	914	610	381	1829	1219	1219	914	
26	660	991	610	406	-	-	-	-	
28	711	1067	711	438	-	-	-	-	
30	762	1143	762	470	-	-	-	-	
32	813	1219	813	502	-	-	-	-	
34	864	1295	864	533	-	-	-	-	
36	914	1372	914	565	-	-	-	-	
38	965	1448	965	600	-	-	-	-	
40	1016	1524	1016	632	-	-	-	-	
42	1067	1600	1067	660	-	-	-	-	
44	1118	1676	1118	695	-	-	-	-	
46	1168	1730	1168	727	-	-	-	-	
48	1219	1829	1219	759	-	-	-	-	
50	1270	1905	1270.0	-	-	-	-	-	
52	1320.8	1981.2	1320.8	-	-	-	-	-	
54	1371.6	2057.4	1371.6	-	-	-	-	-	
56	1422.4	2133.6	1422.4	-	-	-	-	-	
58	1473.2	2209.8	1473.2	-	-	-	-	-	
60	1524	2286	1524.0	-	-	-	-	-	



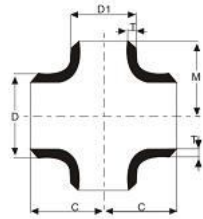
Butt Welding Straight Tees and Crosses 对焊等径三通、四通 ASME B16.9 MSS SP-75 Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径 D	Center to End 中心至端面		Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径	Center to End 中心至端面	
		Run 管程 C	Outlet 出口 M			Run 管程 C	Outlet 出口 M
		1/2	21.3			25	25
3/4	26.7	29	29	1/2 x 1/2 x 1/4	13.7	25	25
1	33.4	38	38	3/4 x 3/4 x 1/2	21.3	29	29
1 1/4	42.2	48	48	3/4 x 3/4 x 3/8	17.3	-	-
1 1/2	48.3	57	57	1 x 1 x 3/4	26.7	38	38
2	60.3	64	64	1 x 1 x 1/2	21.3	-	-
2 1/2	73.0	76	76	1 1/4 x 1 1/4 x 1	33.4	48	48
3	88.9	86	86	1 1/4 x 1 1/4 x 3/4	26.7	-	-
3 1/2	101.6	95	95	1 1/4 x 1 1/4 x 1/2	21.3	-	-
4	114.3	105	105	1 1/2 x 1 1/2 x 1 1/4	42.2	57	57
5	141.3	124	124	1 1/2 x 1 1/2 x 1	33.4	-	-
6	168.3	143	143	1 1/2 x 1 1/2 x 3/4	26.7	-	-
8	219.1	178	178	1 1/2 x 1 1/2 x 1/2	21.3	-	-
10	273.0	216	216	2 x 2 x 1 1/2	48.3	64	60
12	323.8	254	254	2 x 2 x 1 1/4	42.2	64	57
14	355.6	279	279	2 x 2 x 1	33.4	64	51
16	406.4	305	305	2 x 2 x 3/4	26.7	64	44
18	457	343	343	2 1/2 x 2 1/2 x 2	60.3	76	70
20	508	381	381	2 1/2 x 2 1/2 x 1 1/2	48.3	76	67
22	559	419	419	2 1/2 x 2 1/2 x 1 1/4	42.2	76	64
24	610	432	432	2 1/2 x 2 1/2 x 1	33.4	76	57
26	660	495	495	3 x 3 x 2 1/2	73	86	83
28	711	521	521	3 x 3 x 2	60.3	86	76
30	762	559	559	3 x 3 x 1 1/2	48.3	86	73
32	813	597	597	3 x 3 x 1 1/4	42.2	86	70
34	864	635	635	3 1/2 x 3 1/2 x 3	88.9	95	92
36	914	673	673	3 1/2 x 3 1/2 x 2 1/2	73.0	95	89
38	965	711	711	3 1/2 x 3 1/2 x 2	60.3	95	83
40	1016	749	749	3 1/2 x 3 1/2 x 1 1/2	48.3	95	79
42	1067	762	711	4 x 4 x 3 1/2	101.6	105	102
44	1118	813	762	4 x 4 x 3	88.9	105	98
46	1168	851	800	4 x 4 x 2 1/2	73.0	105	95
48	1219	889	838	4 x 4 x 2	60.3	105	89
50	1270	933.5	876.3	4 x 4 x 1 1/2	48.3	105	86
52	1320.8	978	908.05	5 x 5 x 4	114.3	124	117
54	1371.6	1016	946.15	5 x 5 x 3 1/2	101.6	124	114
56	1422.4	1054	977.9	5 x 5 x 3	88.9	124	111
58	1473.2	1092	1016	5 x 5 x 2 1/2	73.0	124	108
60	1524	1118	1054.1	5 x 5 x 2	60.3	124	105





Reducing Tee 异径三通



Reducing Outlet Cross 异径四通

 Buttwelding Reducing Tees and Reducing Crosses  
 对焊异径三通、四通 ASME B16.9 MSS SP-75

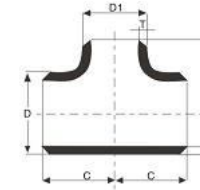
Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		Center to End 中心至端面	
	Run 管程 D	Outlet 出口 D1	Run 管程 C	Outlet 出口 M
6 x 6 x 5		141.3		137
6 x 6 x 4		114.3		130
6 x 6 x 3 1/2	168.3	101.6	143	127
6 x 6 x 3		88.9		124
6 x 6 x 2 1/2		73.0		121
8 x 8 x 6		168.3		168
8 x 8 x 5		141.3		162
8 x 8 x 4	219.1	114.3	178	156
8 x 8 x 3 1/2		101.6		152
10 x 10 x 8		219.1		203
10 x 10 x 6		168.3		194
10 x 10 x 5	273.0	141.3	216	191
10 x 10 x 4		114.3		184
12 x 12 x 10		273.0		241
12 x 12 x 8	323.8	219.1	254	229
12 x 12 x 6		168.3		219
12 x 12 x 5		141.3		216
14 x 14 x 12		323.8		270
14 x 14 x 10	355.6	273.0	279	257
14 x 14 x 8		219.1		248
14 x 14 x 6		168.3		238
16 x 16 x 14		355.6		305
16 x 16 x 12	406.4	323.8	305	295
16 x 16 x 10		273.0		283
16 x 16 x 8		219.1		273
16 x 16 x 6		168.3		264
18 x 18 x 16		406.4		330
18 x 18 x 14	457	355.6	343	330
18 x 18 x 12		323.8		321
18 x 18 x 10		273.0		308
18 x 18 x 8		219.1		298
20 x 20 x 18		457		368
20 x 20 x 16	508	406.4	381	356
20 x 20 x 14		355.6		356
20 x 20 x 12		323.8		346
20 x 20 x 10		273.0		333
20 x 20 x 8		219.1		324
22 x 22 x 20		508		406
22 x 22 x 18	559	457	419	394
22 x 22 x 16		406.4		381
22 x 22 x 14		355.6		381
22 x 22 x 12		323.8		371
22 x 22 x 10		273.0		359
24 x 24 x 22		599		432
24 x 24 x 20	610	508	432	406
24 x 24 x 18		457		419
24 x 24 x 16		406.4		406
24 x 24 x 14		355.6		406
24 x 24 x 12		323.8		397
24 x 24 x 10		273.0		384

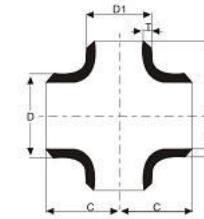
 Buttwelding Reducing Tees and Reducing Crosses  
 对焊异径三通、四通 ASME B16.9 MSS SP-75

Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		Center to End 中心至端面	
	Run 管程 D	Outlet 出口 D1	Run 管程 C	Outlet 出口 M
26 x 26 x 24		610		483
26 x 26 x 22		559		470
26 x 26 x 20	660	508	495	457
26 x 26 x 18		457		444
26 x 26 x 16		406.4		432
26 x 26 x 14		355.6		432
26 x 26 x 12		323.8		422
28 x 28 x 26		660		521
28 x 28 x 24	711	610	521	508
28 x 28 x 22		559		495
28 x 28 x 20		508		483
28 x 28 x 18		457		470
28 x 28 x 16		406.4		457
28 x 28 x 14		355.6		457
28 x 28 x 12		323.8		448
30 x 30 x 28		711		546
30 x 30 x 26		660		546
30 x 30 x 24	762	610	559	533
30 x 30 x 22		559		521
30 x 30 x 20		508		508
30 x 30 x 18		457		495
30 x 30 x 16		406.4		483
30 x 30 x 14		355.6		483
30 x 30 x 12		323.8		473
30 x 30 x 10		273.0		460
32 x 32 x 30		762		584
32 x 32 x 28		711		572
32 x 32 x 26	813	660	597	572
32 x 32 x 24		610		559
32 x 32 x 22		559		546
32 x 32 x 20		508		533
32 x 32 x 18		457		521
32 x 32 x 16		406.4		508
32 x 32 x 14		355.6		508
34 x 34 x 32		813		622
34 x 34 x 30	864	762	635	610
34 x 34 x 28		711		597
34 x 34 x 26		660		597
34 x 34 x 24		610		584
34 x 34 x 22		559		572
34 x 34 x 20		508		559
34 x 34 x 18		457		546
34 x 34 x 16		406.4		533
36 x 36 x 34		864		660
36 x 36 x 32	914	813	673	648
36 x 36 x 30		762		635
36 x 36 x 28		711		622
36 x 36 x 26		660		622
36 x 36 x 24		610		610
36 x 36 x 22		559		597
36 x 36 x 20		508		584
36 x 36 x 18		457		572
36 x 36 x 16		406.4		559



Reducing Outlet Tee 异径三通



Reducing Outlet Cross 异径四通

 Buttwelding Reducing Outlet Tees and Reducing Outlet Crosses  
 对焊异径三通、四通 ASME B16.9 MSS SP-75

Unit:mm

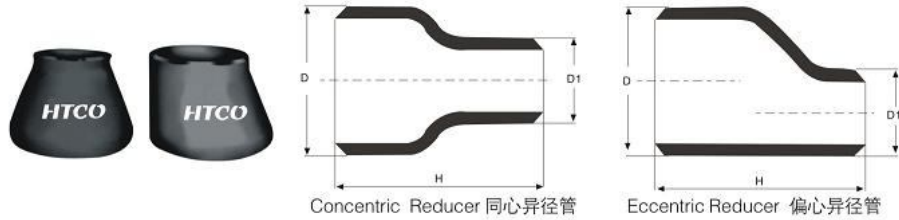
Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		Center to End 中心至端面	
	Run 管程 D	Outlet 出口 D1	Run 管程 C	Outlet 出口 M
38 x 38 x 36		914		711
38 x 38 x 34		863.6		698
38 x 38 x 32	965	813	711	686
38 x 38 x 30		762		673
38 x 38 x 28		711		648
38 x 38 x 26		660		648
38 x 38 x 24		610		635
38 x 38 x 22		559		622
38 x 38 x 20		508		610
38 x 38 x 18		457		597
40 x 40 x 38		965		749
40 x 40 x 36		914		737
40 x 40 x 34	1016	864	749	724
40 x 40 x 32		813		711
40 x 40 x 30		762		698
40 x 40 x 28		711		673
40 x 40 x 26		660		673
40 x 40 x 24		610		660
40 x 40 x 22		559		648
40 x 40 x 20		508		635
40 x 40 x 18		457		622
42 x 42 x 36		914		711
42 x 42 x 34		864		711
42 x 42 x 32		813		711
42 x 42 x 30		762		711
42 x 42 x 28		711		698
42 x 42 x 26		660		698
42 x 42 x 24		610		686
42 x 42 x 22		559		660
42 x 42 x 20		508		660
42 x 42 x 18		457		648
44 x 44 x 42		1067		835
44 x 44 x 40	1118	1016	813	762
44 x 44 x 38		965		757
44 x 44 x 36		914		724
44 x 44 x 34		864		724
44 x 44 x 32		813		711
44 x 44 x 30		762		711
44 x 44 x 28		711		698
44 x 44 x 26		660		698
44 x 44 x 24		610		698
44 x 44 x 22		559		686
44 x 44 x 20		508		686
46 x 46 x 44		1118		800
46 x 46 x 42		1067		787
46 x 46 x 40	1168	1016	851	775
46 x 46 x 38		965		762
46 x 46 x 36		914		762
46 x 46 x 34		864		749
46 x 46 x 32		813		749
46 x 46 x 30		762		737
46 x 46 x 28		711		737
46 x 46 x 26		660		737
46 x 46 x 24		610		724
46 x 46 x 22		559		724

 Buttwelding Reducing Outlet Tees and Reducing Outlet Crosses  
 对焊异径三通、四通 ASME B16.9 MSS SP-75

Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		Center to End 中心至端面	
	Run 管程 D	Outlet 出口 D1	Run 管程 C	Outlet 出口 M
48 x 48 x 46		1168		838
48 x 48 x 44		1118		838
48 x 48 x 42	1219	1067	889	813
48 x 48 x 40		1016		813
48 x 48 x 38		965		813
48 x 48 x 36		914		787
48 x 48 x 34		864		787
48 x 48 x 32		813		787
48 x 48 x 30		762		762
48 x 48 x 28		711		762
48 x 48 x 26		660		737
48 x 48 x 24		610		737
48 x 48 x 22		559		737
48 x 48 x 20		508		737
48 x 48 x 18		457		724
48 x 48 x 16		406		711
50 x 50 x 48		1219.2		876
50 x 50 x 46		1168		876
50 x 50 x 44	1270	1066.8	933	838
50 x 50 x 42		1016		826
50 x 50 x 40		965		800
50 x 50 x 38		914		762
50 x 50 x 36		864		762
50 x 50 x 34		813		762
50 x 50 x 32		762		762
50 x 50 x 30		711		762
50 x 50 x 28		660		762
50 x 50 x 26		610		762
50 x 50 x 24		559		762
50 x 50 x 22		508		762
50 x 50 x 20		457		762
52 x 52 x 50		1270		908.05
52 x 52 x 48		1219.2		908.05
52 x 52 x 46	1320	1066.8	978	876.3
52 x 52 x 44		1016		863.6
52 x 52 x 42		965		831.85
52 x 52 x 40		914		793.75
52 x 52 x 38		864		793.75
52 x 52 x 36		813		793.75
52 x 52 x 34		762		793.75
52 x 52 x 32		711		793.75
52 x 52 x 30		660		793.75
52 x 52 x 28		610		793.75
52 x 52 x 26		559		793.75
52 x 52 x 24		508		793.75
52 x 52 x 22		457		793.75
52 x 52 x 20		406		793.75
54 x 54 x 52		1321		946.15
54 x 54 x 50		1270		946.15
54 x 54 x 48	1372	1067	1016	905.002
54 x 54 x 46		1016		889
54 x 54 x 44		965		863.6
54 x 54 x 42		914		831.85
54 x 54 x 40		864		793.75
54 x 54 x 38		813		793.75
54 x 54 x 36		762		793.75
54 x 54 x 34		711		793.75
54 x 54 x 32		660		793.75
54 x 54 x 30		610		793.75
54 x 54 x 28		559		793.75
54 x 54 x 26		508		793.75
54 x 54 x 24		457		793.75
54 x 54 x 22		406		793.75
54 x 54 x 20		355		793.75
56 x 56 x 54		1372		978
56 x 56 x 52	1422	1219	1054	940
56 x 56 x 50		1168		927
56 x 56 x 48		1118		902
56 x 56 x 46		1067		857
56 x 56 x 44		1016		857
56 x 56 x 42		965		857
56 x 56 x 40		914		857
56 x 56 x 38		864		



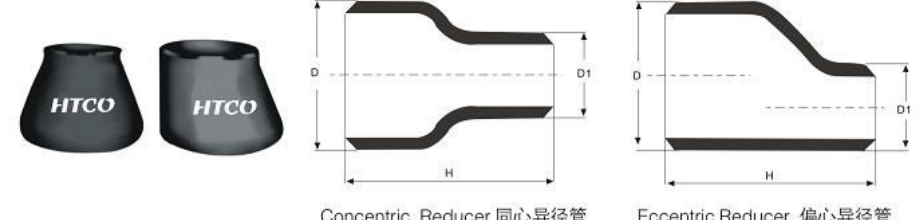


Concentric Reducer 同心异径管

Eccentric Reducer 偏心异径管

Butt Welding Concentric and Eccentric Reducers  
对焊同心、偏心异径管ASME B16.9 MSS SP-75 Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		End to End 端面至端面 H	Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		End to End 端面至端面 H
	Large End 大端	Small End 小端			Large End 大端	Small End 小端	
	D	D1			D	D1	
3/4 x 1/2	26.7	21.3	38	8 x 6	168.3		
3/4 x 3/8		17.3		8 x 5	141.3		
1 x 3/4	33.4	26.7	51	8 x 4	114.3	152	
1 x 1/2		21.3		8 x 3 1/2	101.6		
1 1/4 x 1		33.4		10 x 8	219.1		
1 1/4 x 3/4	42.2	26.7	51	10 x 6	168.3	178	
1 1/4 x 1/2		21.3		10 x 5	141.3		
1 1/2 x 1 1/4		42.2		10 x 4	114.3		
1 1/2 x 1	48.3	33.4	64	12 x 10	273.0		
1 1/2 x 3/4		26.7		12 x 8	219.1	203	
1 1/2 x 1/2		21.3		12 x 6	168.3		
2 x 1 1/2		48.3		12 x 5	141.3		
2 x 1 1/4	60.3	42.2	76	14 x 12	323.8		
2 x 1		33.4		14 x 10	273.0	330	
2 x 3/4		26.7		14 x 8	219.1		
2 1/2 x 2		60.3		14 x 6	168.3		
2 1/2 x 1 1/2	73.0	48.3	89	16 x 14	355.6		
2 1/2 x 1 1/4		42.2		16 x 12	323.8	356	
2 1/2 x 1		33.4		16 x 10	273.0		
3 x 2		60.3		16 x 8	219.1		
3 x 1 1/2	88.9	48.3	89	18 x 16	406.4		
3 x 1 3/4		42.2		18 x 14	355.6	381	
3 1/2 x 3		88.9		18 x 12	323.8		
3 1/2 x 2 1/2		73.0		18 x 10	273.0		
3 1/2 x 2	101.6	60.3	102	20 x 18	457		
3 1/2 x 1 1/2		48.3		20 x 16	406.4	508	
3 1/2 x 1 1/4		42.2		20 x 14	355.6		
4 x 3 1/2		101.6		20 x 12	323.8		
4 x 3	114.3	88.9	102	22 x 20	508		
4 x 2 1/2		73.0		22 x 18	457	508	
4 x 2		60.3		22 x 16	406.4		
4 x 1 1/2		48.3		22 x 14	355.4		
5 x 4		114.3		24 x 22	559		
5 x 3 1/2	141.3	101.6	127	24 x 20	508	508	
5 x 3		88.9		24 x 18	457		
5 x 2 1/2		73.0		24 x 16	406.4		
5 x 2		60.3		26 x 24	610		
6 x 5		141.3		26 x 22	559	610	
6 x 4		114.3		26 x 20	508		
6 x 3 1/2	168.3	101.6	140	26 x 18	457		
6 x 3		88.9					
6 x 2 1/2		73.0					



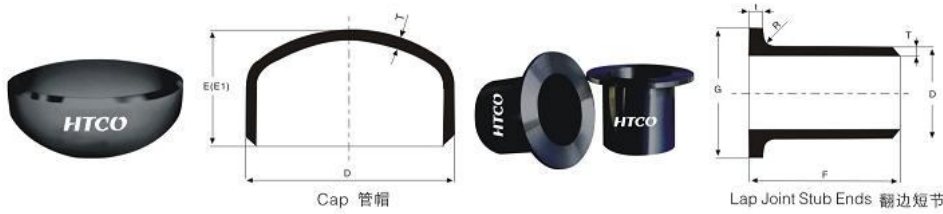
Concentric Reducer 同心异径管

Eccentric Reducer 偏心异径管

Butt Welding Concentric and Eccentric Reducers  
对焊同心、偏心异径管ASME B16.9 MSS SP-75 Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		End to End 端面至端面 H	Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		End to End 端面至端面 H
	Large End 大端	Small End 小端			Large End 大端	Small End 小端	
	D	D1			D	D1	
28 x 26		660		46 x 44		1118	
28 x 24		610		46 x 42		1067	
28 x 20	711	508	610	46 x 40	1168	1016	711
28 x 18		457		46 x 38		965	
30 x 28		711		48 x 46		1168	
30 x 26	762	660	610	48 x 44	1219	1118	711
30 x 24		610		48 x 42		1067	
30 x 20		508		48 x 40		1016	
32 x 30		762		50 x 48		1219	
32 x 28	813	711	610	50 x 42	1270	1067	711
32 x 26		660		50 x 36		914	
32 x 24		610		50 x 30		762	
34 x 32		813		50 x 24		610	
34 x 30	864	762	610	50 x 20		508	
34 x 26		660		52 x 50		1270	
34 x 24		610		52 x 48	1321	1219	711
36 x 34		864		52 x 42		1067	
36 x 32	914	813	610	52 x 36		914	
36 x 30		762		52 x 30		762	
36 x 26		660		52 x 24		610	
36 x 24		610		54 x 52		1321	
38 x 36		914		54 x 48	1372	1219	711
38 x 34		864		54 x 42		1067	
38 x 32	965	813	610	54 x 36		914	
38 x 30		762		54 x 30		762	
38 x 28		711		54 x 24		610	
38 x 26		660		56 x 54		1372	
40 x 38		965		56 x 48	1422	1219	711
40 x 36		914		56 x 42		1067	
40 x 34	1016	864	610	56 x 36		914	
40 x 32		813		56 x 30		762	
40 x 30		762		56 x 24		610	
42 x 40		1016		58 x 56		1422	
42 x 38		965		58 x 54	1473	1372	711
42 x 36	1067	914	610	58 x 48		1219	
42 x 34		864		58 x 42		1067	
42 x 32		813		58 x 36		914	
42 x 30		762		58 x 30		762	
44 x 42		1067		60 x 58		1473	
44 x 40		1016		60 x 54	1524	1372	711
44 x 38	1118	965	610	60 x 48		1219	
44 x 36		914		60 x 42		1067	
				60 x 36		914	
				60 x 30		762	





Butt Welding Caps  
对焊管帽ASME B16.9

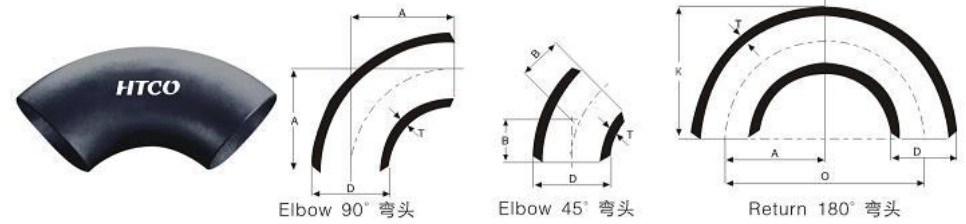
MSS SP-75 Unit:mm

Lap Joint Stub End  
翻边短节 ASME B16.9

Unit:mm

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径			Limiting Wall Thickness for Size E 对尺寸E的限制厚度
	D	E	E1	
1/2	21.3	25	25	4.57
3/4	26.7	25	25	3.81
1	33.4	38	38	4.57
1 1/4	42.2	38	38	4.83
1 1/2	48.3	38	38	5.08
2	60.3	38	44	5.59
2 1/2	73.0	38	51	7.11
3	88.9	51	64	7.62
3 1/2	101.6	64	76	8.13
4	114.3	64	76	8.64
5	141.3	76	89	9.65
6	168.3	89	102	10.92
8	219.1	102	127	12.70
10	273.0	127	152	12.70
12	323.8	152	178	12.70
14	355.6	165	191	12.70
16	406.4	178	203	12.70
18	457	203	229	12.70
20	508	229	254	12.70
22	559	254	254	12.70
24	610	267	305	12.70
26	660	267	-	-
28	711	267	-	-
30	762	267	-	-
32	813	267	-	-
34	864	267	-	-
36	914	267	-	-
38	965	305	-	-
40	1016	305	-	-
42	1067	305	-	-
44	1118	343	-	-
46	1168	343	-	-
48	1219	343	-	-
50	1270	368	-	-
52	1321	368	-	-
54	1372	406	-	-
56	1422	406	-	-
58	1473	419	-	-
60	1524	419	-	-

Nominal Pipe Size 公称尺寸	Outside Diameter at Bevel 端部外径		Long Pattern Length 长型长度	Short Pattern Length 短型长度	Radius of Fillet 圆角半径	Diameter of Lap 搭接直径
	Max	Min				
1/2	22.8	20.5	76	51	3	35
3/4	28.1	25.9	76	51	3	43
1	35.0	32.6	102	51	3	51
1 1/4	43.6	41.4	102	51	5	64
1 1/2	49.9	47.5	102	51	6	73
2	62.4	59.5	152	64	8	92
2 1/2	75.3	72.2	152	64	8	105
3	91.3	88.1	152	64	10	127
3 1/2	104.0	100.8	152	76	10	140
4	116.7	113.5	152	76	11	157
5	144.3	140.5	203	76	11	186
6	171.3	167.5	203	89	13	216
8	222.1	218.3	203	102	13	270
10	277.2	272.3	254	127	13	324
12	328.0	323.1	254	152	13	381
14	359.9	354.8	305	152	13	413
16	411.0	405.6	305	152	13	470
18	462	456	305	152	13	533
20	514	507	305	152	13	584
22	565	558	305	152	13	641
24	616	609	305	152	13	692



Butt Welding Elbows and Returns

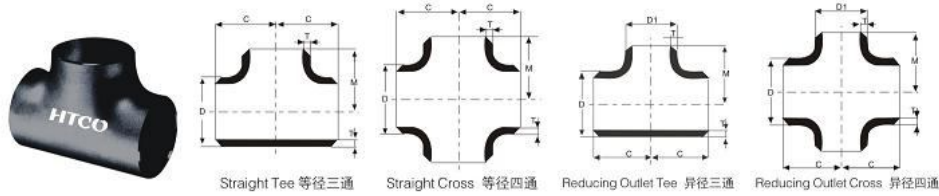
对焊弯头 GB/T12459-2005

GB/T13401-2005

Unit:mm

Nominal pipe size 公称尺寸 (DN)	Outside Diameter at Bevel 端部 外径 D		Center to End 中心至端面		Center to Center 中心至中心		Back to Face 背面至端面				
			Elbows 90° 弯头		Elbows 45° 弯头		Return 180° 弯头				
			A		B		O		K		
	Series   系列	Series    系列	Long Radius 长半径	Short Radius 短半径	Long Radius 长半径	Long Radius 长半径	Short Radius 短半径	Long Radius 长半径		Short Radius 短半径	
15	21.3	18	38	—	16	76	—	48	47	—	—
20	26.9	25	38	—	19	76	—	51	51	—	—
25	33.7	32	38	25	22	76	51	56	54	41	41
32	42.4	38	48	32	25	95	64	70	67	52	51
40	48.3	45	57	38	29	114	76	83	80	62	61
50	60.3	57	76	51	35	152	102	106	105	81	79
65	73.0	76	95	64	44	190	127	132	133	100	102
80	88.9	89	114	76	51	229	152	159	159	121	121
90	101.6	—	133	89	57	267	178	184	—	140	—
100	114.3	108	152	102	64	305	203	210	206	159	156
125	141.3	133	190	127	79	381	254	262	257	197	194
150	168.3	159	229	152	95	457	305	313	308	237	232
200	219.1	219	305	203	127	610	406	414	414	313	313
250	273	273	381	254	159	762	508	518	518	391	391
300	323.9	325	457	305	190	914	610	619	620	467	467
350	355.6	377	533	356	222	1067	711	711	722	533	544
400	406.4	426	610	406	254	1219	813	813	823	610	619
450	457	480	686	457	286	1372	914	914	925	686	697
500	508	530	762	508	318	1524	1016	1016	1026	762	773
550	559	—	838	559	343	1676	1118	1118	—	838	—
600	610	630	914	610	381	1829	1219	1219	1229	914	925
650	660	—	991	—	406	—	—	—	—	—	—
700	711	720	1067	—	438	—	—	—	—	—	—
750	762	—	1143	—	470	—	—	—	—	—	—
800	813	820	1219	—	502	—	—	—	—	—	—
850	864	—	1295	—	533	—	—	—	—	—	—
900	914	920	1372	—	565	—	—	—	—	—	—
950	965	—	1448	—	600	—	—	—	—	—	—
1000	1016	1020	1524	—	632	—	—	—	—	—	—
1050	1067	—	1600	—	660	—	—	—	—	—	—
1100	1118	1120	1676	—	695	—	—	—	—	—	—
1150	1168	—	1753	—	727	—	—	—	—	—	—
1200	1219	1220	1829	—	759	—	—	—	—	—	—





Butt welding Straight Tees and Crosses 对焊等径三通、四通 GB/T12459-2005 GB/T13401-2005 Unit:mm  
 Butt welding Reducing Tees and Reducing Outlet Crosses 对焊异径三通、四通 GB/T12459-2005 GB/T13401-2005 Unit:mm

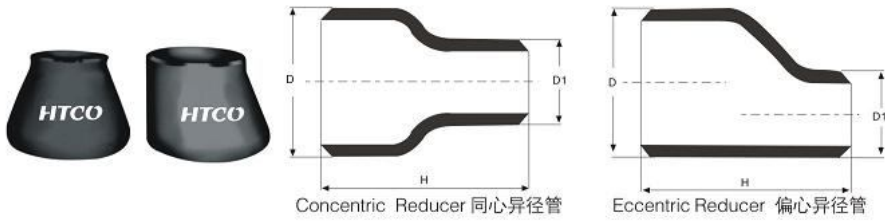
Nominal Pipe Size 公称尺寸 尺寸 (DN)	Outside Diameter at Bevel 端部外径		Center to End 中心至端面		Nominal Pipe Size 公称尺寸 尺寸 (DN)	Outside Diameter at Bevel 端部外径				Center to End 中心至端面	
	D		Run 管程	Outlet 出口		Large End 大端		Small End 小端		Run 管程 C	Outlet 出口 M
	Series I I 系列	Series II II 系列	C	M		D	D1	Series I I 系列	Series II II 系列		
15	21.3	18	25	25	15 × 15 × 10	21.3	18	17.3	14	25	25
20	26.9	25	29	29	15 × 15 × 8			13.7	10		
25	33.7	32	38	38	20 × 20 × 15	26.9	25	21.3	18	29	29
32	42.4	38	48	48	20 × 20 × 10			17.3	14		
40	48.3	45	57	57	25 × 25 × 20	33.7	32	26.9	25	38	38
50	60.3	57	64	64	25 × 25 × 15			21.3	18		
65	73.0	76	76	76	32 × 32 × 25	42.4	38	33.7	32	48	48
80	88.9	89	86	86	32 × 32 × 20			26.9	25		
90	101.6	-	95	95	32 × 32 × 15			21.3	18		
100	114.3	108	105	105	40 × 40 × 32	48.3	45	42.4	38	57	57
125	141.3	133	124	124	40 × 40 × 25			33.7	32		
150	168.3	159	143	143	40 × 40 × 20			26.9	25		
200	219.1	219	178	178	40 × 40 × 15			21.3	18		
250	273.0	273	216	216	50 × 50 × 40	60.3	57	48.3	45	64	60
300	323.9	325	254	254	50 × 50 × 32			42.4	38		57
350	355.6	377	279	279	50 × 50 × 25			33.7	32		51
400	406.4	426	305	305	50 × 50 × 20			26.9	25		44
450	457	480	343	343	65 × 65 × 50	73.0	76	60.3	57	70	70
500	508	530	381	381	65 × 65 × 40			48.3	45		67
550	559	-	419	419	65 × 65 × 32			42.4	38		64
600	610	630	432	432	65 × 65 × 25			33.7	32		57
650	660	-	495	495	80 × 80 × 65	88.9	89	73.0	76	83	83
700	711	720	521	521	80 × 80 × 50			60.3	57		76
750	762	-	559	559	80 × 80 × 40			48.3	45		73
800	813	820	597	597	80 × 80 × 32			42.4	38		70
850	864	-	635	635	90 × 90 × 80	101.6	-	88.9	-	92	92
900	914	920	673	673	90 × 90 × 65			73.0	-		89
950	965	-	711	711	90 × 90 × 50			60.3	-		83
1000	1016	1020	749	749	100 × 100 × 90			101.6	-		102
1050	1067	-	762	711	100 × 100 × 80	114.3	108	88.9	89	105	98
1100	1118	1120	813	762	100 × 100 × 65			73.0	76		95
1150	1168	-	851	800	100 × 100 × 50			60.3	57		89
1200	1219	1220	889	838	100 × 100 × 40			48.3	45		86



Butt welding Reducing Tees and Reducing Crosses 对焊异径三通、四通 GB/T12459-2005 GB/T13401-2005 Unit:mm  
 Butt welding Reducing Tees and Reducing Crosses 对焊异径三通、四通 GB/T12459-2005 GB/T13401-2005 Unit:mm

Nominal Pipe Size 公称尺寸 尺寸 (DN)	Outside Diameter at Bevel 端部外径		Center to End 中心至端面		Nominal Pipe Size 公称尺寸 尺寸 (DN)	Outside Diameter at Bevel 端部外径				Center to End 中心至端面	
	D		Run 管程 C	Outlet 出口 M		Large End 大端		Small End 小端		Run 管程 C	Outlet 出口 M
	Series I I 系列	Series II II 系列	D	D1		Series I I 系列	Series II II 系列	Series I I 系列	Series II II 系列		
125 × 125 × 100		133	114.3	133	660 × 660 × 600	660	-	610	-	495	463
125 × 125 × 90	141.3	-	101.6	-	660 × 660 × 550			559	-		470
125 × 125 × 80		133	88.9	89	660 × 660 × 500			508	-		457
150 × 150 × 125		159	141.3	133	700 × 700 × 650	711	-	660	-	521	521
150 × 150 × 100	168.3	159	114.3	108	700 × 700 × 600		720	610	630	521	508
150 × 150 × 90		-	101.6	-	700 × 700 × 550		-	559	-		495
200 × 200 × 150		168.3	159	168	750 × 750 × 700	762	-	711	-	559	546
200 × 200 × 125	219.1	219	141.3	133	750 × 750 × 650		-	660	-		546
200 × 200 × 100		168.3	114.3	108	750 × 750 × 600		-	610	-		533
250 × 250 × 200		219.1	219	203	800 × 800 × 700	813	-	762	-	635	584
250 × 250 × 150	273.0	273	168.3	159	800 × 800 × 650		820	711	720	597	572
250 × 250 × 125		141.3	133	191	800 × 800 × 600		-	660	-		572
300 × 300 × 250	323.9	325	273.0	273	850 × 850 × 800	864	-	813	-	635	622
300 × 300 × 200		219.1	219	229	850 × 850 × 750		-	762	-		610
300 × 300 × 150		168.3	159	219	850 × 850 × 700		-	711	-		597
350 × 350 × 300		323.9	325	270	900 × 900 × 850	914	-	864	-	673	660
350 × 350 × 250	355.6	377	273.0	273	900 × 900 × 800		920	813	820	673	648
350 × 350 × 200		219.1	219	248	900 × 900 × 750		-	762	-		635
400 × 400 × 350		355.6	377	305	950 × 950 × 900	965	-	914	-	711	711
400 × 400 × 300	406.4	426	323.9	325	950 × 950 × 850		-	864	-		688
400 × 400 × 250		273.0	273	283	950 × 950 × 800		-	813	-		666
450 × 450 × 400		406.4	426	330	1000 × 1000 × 950	1017	-	965	-	749	749
450 × 450 × 350	457	480	355.6	377	1000 × 1000 × 900		1020	914	920	749	737
450 × 450 × 300		323.9	325	321	1000 × 1000 × 850		-	864	-		724
500 × 500 × 450		457	480	368	1050 × 1050 × 1000	1067	-	1016	-	762	711
500 × 500 × 400	508	530	406.4	426	1050 × 1050 × 950		-	965	-		711
500 × 500 × 350		355.6	377	356	1050 × 1050 × 900		-	914	-		711
550 × 550 × 500		508	-	406	1100 × 1100 × 1050	1118	-	1067	-	813	762
550 × 550 × 450	559	-	457	394	1100 × 1100 × 1000		1120	1016	1020	813	749
550 × 550 × 400		406.4	-	381	1100 × 1100 × 950		-	965	-		737
600 × 600 × 550		559	-	432	1150 × 1150 × 1100	1168	-	1118	-	851	800
600 × 600 × 500		508	530	432	1150 × 1150 × 1050		-	1067	-		787
600 × 600 × 450		457	480	419	1150 × 1150 × 1000		-	1016	-		775
600 × 600 × 400	610	630	406.4	426	1200 × 1200 × 1150		-	1168	-		838
600 × 600 × 350		355.6	377	406	1200 × 1200 × 1100	1219	-	1220	1118	889	838
600 × 600 × 300		323.9	325	397	1200 × 1200 × 1050		-	1067	-		813





Buttwelding Concentric and Eccentric Reducers

对焊同心、偏心异径管 GB/T12459-2005 GB/T13401-2005 Unit:mm

Nominal Pipe Size 公称尺寸 (DN)	Outside Diameter at Bevel 端部外径				End to End 端面至端面 H
	Large End 大端 D		Small End 小端 D1		
	Series I I 系列	Series II II 系列	Series I I 系列	Series II II 系列	
25 x 20	33.7	32	26.9	25	51
25 x 15			21.3	18	
32 x 25			33.7	32	
32 x 20	42.4	38	26.9	25	51
32 x 15			21.3	18	
40 x 32			42.4	38	
40 x 25	48.3	45	33.7	32	64
40 x 20			26.9	25	
50 x 40			48.3	45	
50 x 32	60.3	57	42.4	38	76
50 x 25			33.7	32	
65 x 50			60.3	57	
65 x 40	73.0	76	48.3	45	89
65 x 32			42.4	38	
80 x 65			73.0	76	
80 x 50	88.9	89	60.3	57	89
80 x 40			48.3	45	
90 x 80			88.9		
90 x 65	101.6		73.0		102
90 x 50			60.3		
100 x 90			101.6		
100 x 80	114.3		108	89	102
100 x 65			108	76	
125 x 100			133	108	
125 x 90	141.3		101.6		127
125 x 80			133	89	
150 x 125			159	133	
150 x 100	168.3	159	114.3	108	140
150 x 90			101.6		
200 x 150			168.3	159	
200 x 125	219.1	219	141.3	133	152
200 x 100			114.3	108	
250 x 200			219.1	219	
250 x 150	273.0	273	168.3	159	178
250 x 125			141.3	133	
300 x 250			273.0	273	
300 x 200	323.9	325	219.1	219	203
300 x 150			168.3	159	
350 x 300			323.9	325	
350 x 250	355.6	377	273.0	273	330
350 x 200			219.1	219	
400 x 350			355.6	377	
400 x 300	406.4	426	323.9	325	356
400 x 250			273.0	273	
450 x 400			406.4	426	
450 x 350	457	480	355.6	377	381
450 x 300			323.9	325	
500 x 450			457	480	
500 x 400	508	530	406.4	426	508
500 x 350			355.6	377	

Buttwelding Concentric and Eccentric Reducers

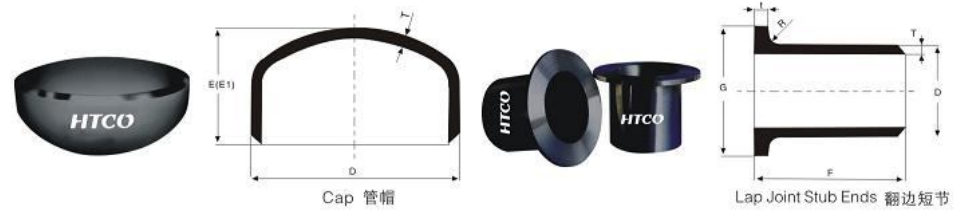
对焊同心、偏心异径管 GB/T12459-2005 GB/T13401-2005 Unit:mm

Nominal Pipe Size 公称尺寸 (DN)	Outside Diameter at Bevel 端部外径				H
	Large End 大端 D		Small End 小端 D1		
	Series I I 系列	Series II II 系列	Series I I 系列	Series II II 系列	
500 x 450			457	480	
500 x 400			406.4	426	
500 x 350			355.6	377	
500 x 300	508	530	323.9	325	508
550 x 500			508		
550 x 450			457		
550 x 400	559		406.4		508
550 x 350			355.6		
600 x 550			559		
600 x 500			630	530	
600 x 450	610		630	480	508
600 x 400			630	426	
650 x 600			610		
650 x 550			559		
650 x 500	660		508		610
650 x 450			457		
700 x 650			660		
700 x 600	711		720	630	610
700 x 550			559		
700 x 500			508	530	
750 x 700			711		
750 x 650	762		660		610
750 x 600			610		
800 x 750			762		
800 x 700			711		
800 x 650	813	820	711	720	610
850 x 800			660		
850 x 750			813		
850 x 700	864		762		610
850 x 650			711		
900 x 850			864		
900 x 800			813		
900 x 750	914	920	762	820	610
950 x 900			914		
950 x 850			864		
950 x 800	965		813		610
1000 x 950			965		
1000 x 900			1020	914	610
1000 x 850	1016		864		
1050 x 1000			1016		
1050 x 950	1067		965		610
1050 x 900			914		
1100 x 1050			1067		
1100 x 1000			1120	1016	610
1100 x 950	1118		965		
1150 x 1100			1118		
1150 x 1050	1168		1067		711
1150 x 1000			1016		
1200 x 1150			1168		
1200 x 1100	1219		1220	1118	711
1200 x 1050			1067		

Buttwelding Caps

对焊管帽 GB/T12459-2005 GB/T13401-2005 Unit:mm

Nominal Pipe Size 公称尺寸 (DN)	Outside Diameter at Bevel 端部外径 D		全长 Length		Limiting Wall Thickness for Length E 对尺寸E的限制厚度
	Large End 大端 D		Small End 小端 D1		
	Series I I 系列	Series II II 系列	E	E1	
15	21.3	18	25	25	4.57
20	26.9	25	25	25	3.81
25	33.7	32	38	38	4.57
32	42.4	38	38	38	4.83
40	48.3	45	38	38	5.08
50	60.3	57	38	44	5.59
65	73.0	76	38	51	7.11
80	88.9	89	51	64	7.62
90	101.6		64	76	8.13
100	114.3	108	64	76	8.64
125	141.3	133	76	89	9.65
150	168.3	159	89	102	10.92
200	219.1	219	102	127	12.7
250	273.0	273	127	152	12.7
300	323.9	325	152	178	12.7
350	355.6	377	165	191	12.7
400	406.4	426	178	203	12.7
450	457	480	203	229	12.7
500	508	530	229	254	12.7
550	559		254	254	12.7
600	610	630	267	305	12.7
650	660		267		
700	711	720	267		
750	762		267		
800	813	820	267		
850	864		267		
900	914	920	267		
950	965		305		
1000	1016	1020	305		
1050	1067		305		
1100	1118	1120	343		
1150	1168		343		
1200	1219	1220	343		



Lap Joint Stub Ends

翻边短节 GB/T12459-2005 Unit:mm

Nominal Pipe Size 公称尺寸 (DN)	Outside Diameter at Bevel 端部外径 D		Long Pattern Length 长型长度 F	Short Pattern Length 短型长度 F	Radius of Fillet 圆角半径 R	Diameter of Lap 搭接直径 G
	Large End 大端 D					
	Max	Min				
15	22.8	20.5	76	51	3	35
20	28.1	25.9	76	51	3	43
25	35.0	32.6	102	51	3	51
32	43.6	41.4	102	51	5	64
40	49.9	47.5	102	51	6	73
50	62.4	59.5	152	64	8	92
65	75.3	72.2	152	64	8	105
80	91.3	88.1	152	64	10	127
90	104.0	100.8	152	76	10	140
100	116.7	113.5	152	76	11	157
125	144.3	140.5	203	76	11	186
150	171.3	167.5	203	89	13	216
200	222.1	218.3	203	102	13	270
250	277.2	272.3	254	127	13	324
300	328.0	323.1	254	152	13	381
350	359.9	354.8	305	152	13	413
400	411.0	405.6	305	152	13	470
450	462	456	305	152	13	533
500	514	507	305	152	13	584
550	565	558	305	152	13	641
600	616	609	305	152	13	692



**Hot Induction Bend**

HTCO's hot induction bends are manufactured in compliance with following applicable standards and non-standard as required by customers.

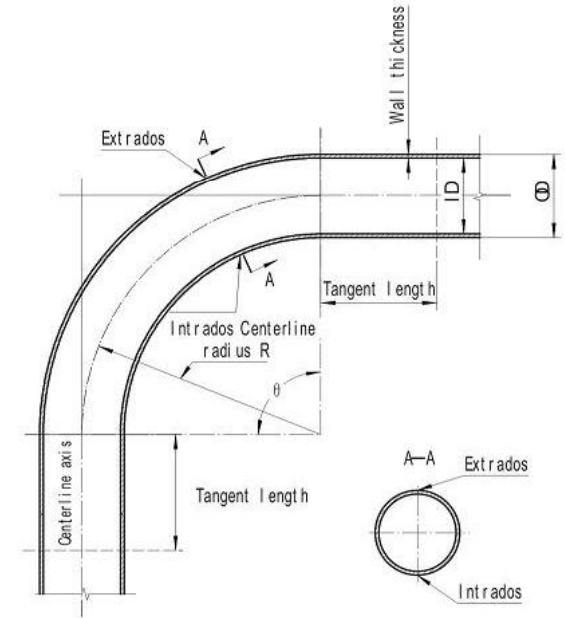
ASME B16.49-2007 ASME B16.25-2007  
MSS SP-75-2008 ASME B31.1-1998 ASME B31.8-2007

Nominal Pipe Size in.	Outside Diameter O.D.(mm)	BENDING RADIUS(mm)						Angle Bending $\theta$	Tangent length at each end	Wall Thickness (mm)
		3D	4D	5D	6D	8D	10D			
3"	89	267	356	445	534	712	890	90°, 60°, 45°, 30°, 22.5°, or as per the choice of purchaser	350	Sch STD, Sch 10, Sch 20, Sch 30, Sch 40, Sch 80, etc. or as per the choice of purchaser
4"	114	342	456	570	684	912	1140		350	
6"	168	504	672	840	1008	1344	1680		350	
8"	219	657	876	1095	1314	1752	2190		700	
10"	273	819	1092	1365	1638	2184	2730		700	
12"	325	975	1300	1625	1950	2600	3250		700	
14"	356	1068	1424	1780	2136	2848	3560		700	
16"	406	1218	1624	2030	2436	3248	4060		700	
18"	457	1371	1828	2285	2742	3656	4570		1000	
20"	508	1524	2032	2540	3048	4064	5080		1000	
22"	559	1677	2236	2795	3354	4472	5590		1000	
24"	610	1830	2440	3050	3660	4880	6100		1000	
26"	660	1980	2640	3300	3960	5280	6600		1D (Outside diameter of bend) or as per the choice of purchaser	
28"	711	2133	2844	3555	4266	5688	7110			
30"	762	2286	3048	3810	4572	6096	7620			
32"	813	2439	3252	4065	4878	6504	8130			
34"	864	2592	3456	4320	5184	6912	8640			
36"	914	2742	3656	4570	5484	7312	9140			
38"	965	2895	3860	4825	5790	7720	9650			
40"	1016	3048	4064	5080	6096	8128	10160			
42"	1067	3201	4268	5335	6402	8536	10670			
44"	1118	3354	4472	5590	6708	8944	11180			
46"	1168	3504	4672	5840	7008	9344	11680			
48"	1219	3657	4876	6095	7314	9752	12190			
50"	1270	3810	5080	6350	7620	10160	12700			
52"	1321	3963	5284	6605	7926	10568	13210			
54"	1372	4116	5488	6860	8232	10976	13720			
56"	1422	4266	5688	7110	8532	11376	14220			

Bend end preparation: Welding ends to be beveled as per ASME B16.25 or as per specified by purchaser

**Induction Pipe Bending Standard Bend Tolerances**

Bend Angle:  $\pm 1/2^\circ$   
Bend Radius:  $\pm 1\%$   
Bend Radius:  $\pm 1\%$   
Bend Plane:  $\pm 1^\circ$



**End squareness**

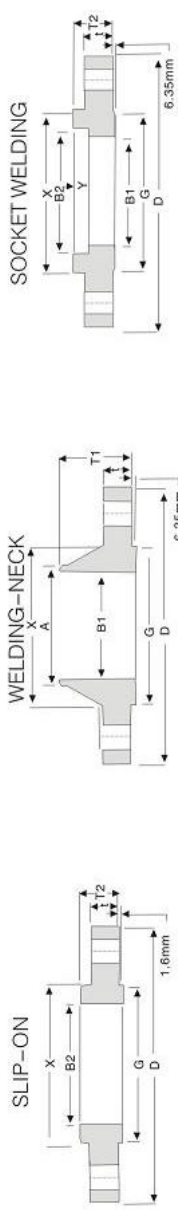
Size NPS 36" and smaller: 2.4 mm (0.09")  
Size Greater than NPS 36": 3.0 mm (0.12")

**Linear Dimensions**

Size NPS 24" and smaller:  $\pm 5$  mm (0.19")  
Size Greater than NPS 24":  $\pm 6$  mm (0.25")  
Wall Thickness:  $< 0.10\%$  of the bend nominal wall thickness  
Ovality within bend:  $\leq 3\%$  of the nominal mating pipe outside diameter.  
Ovality at the welding ends:  $\leq 1\%$  of the nominal mating pipe outside diameter.  
Outside diameter at each welding end:  $\pm 1\%$  of the mating pipe outside diameter  
Inside diameter at each welding end: Size NPS 36" and smaller:  $\pm 2.5$  mm (0.10")  
Size larger than NPS 36":  $\pm 3.0$  mm (0.12")

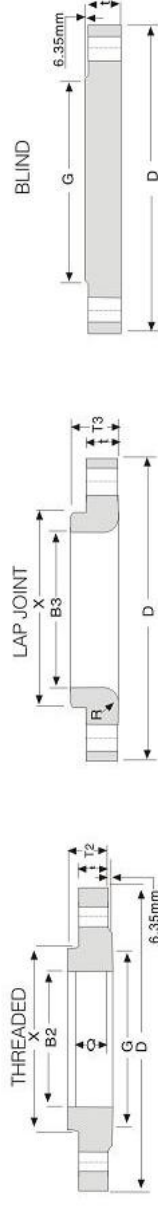
Inside diameter at any location in the bend:  $> 97\%$  of the minimum specified matching pipe internal diameter.





ANSIB 16.5 Forged Flange Class 150 锻造法兰 ANSI B16.5 标准 150#

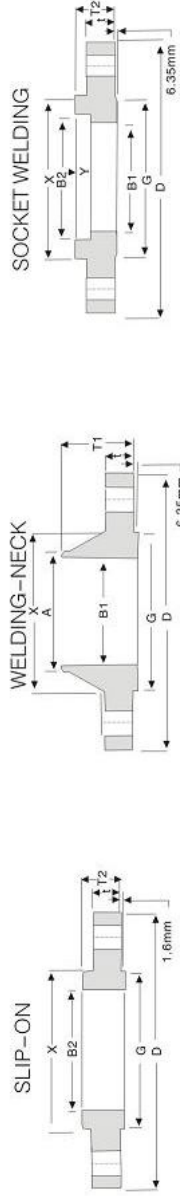
Nominal Pipe Size 公称管径	Outside Diameter 法兰外径	Thickness of Flange 法兰厚度	Nominal Diameter of Hub 公称直径	Raised Face Diameter 凸面直径	Hub Diameter 法兰外径	Welding Neck Diameter 焊接颈直径	Depth of Socket 承插深度	Length Through Hub 含颈高度		Bore Flange Hole 法兰孔		Drilling Hole 钻孔		Approximate Weight 重量							
								Thread Length 螺纹长度	Threaded Socket 承插深度	Welding Neck 焊接颈	Lapped Socket 活套法兰	Welding Neck 焊接颈	Slip-on Socket 活套法兰		No. of Holes 螺栓孔数	Diameter of Holes 螺栓孔直径	Diameter of Bolt Circle 螺栓孔心圆直径	Threaded Socket 承插深度	Welding Neck 焊接颈	Blind Lapped 盲套法兰	
NPS	O	t <sub>f</sub>	X	G	A	Y	D	Y	Y	B	B	—	—	—							
1/2	90	9.6	30	35.1	21.3	16	10	3	14	16	46	22.2	22.9	15.8	4	16	60.3	0.9	0.5	0.5	0.5
3/4	100	11.2	38	42.9	26.7	16	11	3	14	16	51	27.7	28.2	20.9	4	16	69.9	0.9	0.9	0.9	0.9
1	110	12.7	49	50.8	33.4	17	13	3	16	17	54	34.5	34.9	26.6	4	16	79.4	1.4	0.9	0.9	0.9
1 1/4	115	14.3	59	63.5	42.2	21	14	5	19	21	56	43.2	43.7	35.1	4	16	88.9	1.4	1.4	1.4	1.4
1 1/2	125	15.9	65	73.2	48.3	22	16	6	21	22	60	49.5	50.0	40.9	4	16	98.4	1.8	1.4	1.4	1.4
2	150	17.5	78	91.9	60.3	25	17	8	24	25	62	61.9	62.5	52.5	4	20	120.7	2.7	2.3	2.3	2.3
2 1/2	180	20.7	90	104.6	73.0	29	19	8	27	29	68	74.6	75.4	62.7	4	20	139.7	3.6	3.2	3.2	3.2
3	190	22.3	108	127.0	88.9	30	21	10	29	30	68	90.7	91.4	77.9	4	20	152.4	4.5	3.6	4.1	3.6
3 1/2	215	22.3	122	139.7	101.6	32	—	10	30	32	70	103.4	104.1	90.1	8	20	177.8	5.4	5.0	5.9	5.0
4	230	22.3	135	157.2	114.3	33	—	11	32	33	75	116.1	116.8	102.3	8	20	190.5	6.8	5.9	7.7	5.9
5	255	22.3	164	185.7	141.3	36	—	11	35	36	87	143.8	144.4	128.2	8	22.3	215.9	8.6	6.8	9.1	6.8
6	280	23.9	192	215.9	168.3	40	—	13	38	40	87	170.7	171.4	154.1	8	22.3	241.3	10.9	8.6	11.8	8.6
8	345	27.0	246	269.7	219.1	44	—	13	43	44	100	221.5	222.2	202.7	8	22.3	298.5	17.7	13.6	20.4	13.6
10	405	28.6	305	323.9	273.0	49	—	13	48	49	100	276.2	277.4	254.6	12	25.4	362.0	23.6	19.5	31.8	19.5
12	485	30.2	365	381.0	323.8	56	—	13	54	56	113	327.0	328.2	304.8	12	25.4	431.8	36.3	29.0	49.9	29.0
14	535	33.4	400	412.8	355.6	57	—	13	56	79	125	359.2	360.2	—	12	28.6	476.3	50.0	41.0	63.5	47.6
16	595	35.0	457	469.9	406.4	64	—	13	62	87	125	410.5	411.2	—	16	28.6	539.8	64.0	44.5	81.6	63.5
18	635	38.1	505	533.4	457.0	68	—	13	67	97	138	461.8	462.3	—	16	32	577.9	68.0	59.0	99.8	72.6
20	700	41.3	559	584.2	508.0	73	—	13	71	103	143	513.1	514.4	—	20	32	635.0	81.6	75.0	129.0	88.5
24	815	46.1	663	692.2	610.0	83	—	13	81	111	151	616.0	616.0	—	20	35	749.3	118.0	99.8	195.0	125.0



ANSIB 16.5 Forged Flange Class 300 锻造法兰 ANSI B16.5 标准 300#

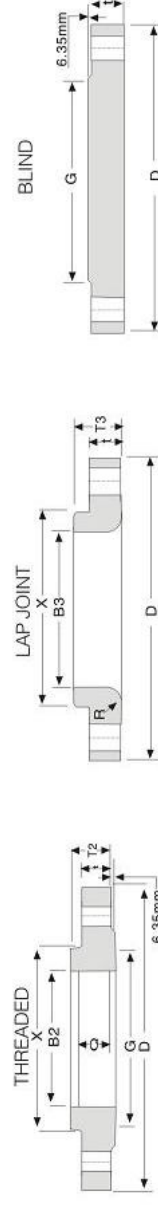
Nominal Pipe Size 公称管径	Outside Diameter 法兰外径	Thickness of Flange 法兰厚度	Nominal Diameter of Hub 公称直径	Raised Face Diameter 凸面直径	Hub Diameter 法兰外径	Welding Neck Diameter 焊接颈直径	Depth of Socket 承插深度	Length Through Hub 含颈高度		Bore Flange Hole 法兰孔		Drilling Hole 钻孔		Approximate Weight 重量							
								Thread Length 螺纹长度	Threaded Socket 承插深度	Welding Neck 焊接颈	Lapped Socket 活套法兰	Welding Neck 焊接颈	Slip-on Socket 活套法兰		No. of Holes 螺栓孔数	Diameter of Holes 螺栓孔直径	Diameter of Bolt Circle 螺栓孔心圆直径	Threaded Socket 承插深度	Welding Neck 焊接颈	Blind Lapped 盲套法兰	
NPS	O	t <sub>f</sub>	X	G	A	Y	D	Y	Y	B	B	—	—	—							
1/2	95	12.7	38	35.1	21.3	16	10	3	21	22	51	22.2	22.9	15.8	4	16	66.7	0.9	0.9	0.9	0.9
3/4	115	14.3	48	42.9	26.7	16	11	3	24	25	56	27.7	28.2	20.9	4	20	82.6	1.4	1.4	1.4	1.4
1	125	15.9	54	50.8	33.4	18	13	3	25	27	60	34.5	34.9	26.6	4	20	88.9	1.8	1.4	1.4	1.4
1 1/4	135	17.5	64	63.5	42.2	21	14	5	25	27	64	43.2	43.7	35.1	4	20	98.4	2.3	1.8	1.8	1.8
1 1/2	155	19.1	70	73.2	48.3	23	16	6	29	30	67	49.5	50	40.9	4	22.3	114.3	3.2	2.7	2.7	2.7
2	165	20.7	84	91.9	60.3	29	17	8	32	33	68	61.9	62.5	52.5	8	20	127	4.1	3.2	3.6	3.2
2 1/2	190	23.9	100	104.6	73	32	19	8	37	38	75	74.6	75.4	62.7	8	22.3	149.2	5.4	4.5	5.4	4.5
3	210	27	117	127.0	88.9	32	21	10	41	43	78	90.7	91.4	77.9	8	22.3	168.3	6.8	5.9	7.3	5.9
3 1/2	230	28.6	133	139.7	101.6	37	—	10	43	44	79	103.4	104.1	90.1	8	22.3	184.4	8.2	7.7	9.5	7.7
4	255	30.2	146	157.2	114.3	37	—	11	46	48	84	116.1	116.8	102.3	8	22.3	200	11.3	10	12.2	10
5	280	33.4	178	185.7	141.3	43	—	11	49	51	97	143.8	144.4	128.2	8	22.3	235	14.5	12.7	15.9	12.7
6	320	35	206	215.9	168.3	47	—	13	51	52	97	170.7	171.4	154.1	12	22.3	269.9	19	17.7	22.7	17.7
8	380	39.7	260	269.7	219.1	51	—	13	60	62	110	221.5	222.2	202.7	12	25.4	330.2	30.4	26.3	36.7	26.3
10	445	46.1	321	323.9	273	56	—	13	65	95	116	276.2	277.4	254.6	16	29	387.4	41.3	36.7	56.7	41.3
12	520	49.3	375	381.0	323.8	61	—	13	71	102	129	327	328.2	304.8	16	32	450.8	63.5	52.2	83.9	63.5
14	585	52.4	425	412.8	355.6	64	—	13	75	111	141	359.2	360.2	—	20	32	514.4	81.6	74.8	113	86.2
16	650	55.6	483	469.9	406.4	69	—	13	81	121	144	410.5	411.2	—	20	35	571.5	113	86.2	134	113
18	710	58.83	533	533.4	457	70	—	13	87	130	157	461.8	462.3	—	24	35	628.6	145	113	179	134
20	775	62	587	584.2	508	74	—	13	94	140	160	513.1	514.4	—	24	35	685.8	181	143	229	168
24	915	68.3	702	692.2	610	83	—	13	105	152	167	616	616	—	24	41.3	812.8	263	215	356	249





ANSI B 16.5 Forged Flange Class 600 锻造法兰 ANSI B 16.5 标准 600#

Nominal Pipe Size 公称口径	Outside Diameter 法兰外径	Thickness of Flange 法兰最小厚度	Hub Diameter 法兰颈部直径			Depth of Socket 承插深度	Core of Socket 承插芯径	Length Through Hub 含颈高度			Bore Flange 法兰内径			Drilling Holes 钻孔			Approximate Weight 重量			
			Released Face Diameter 法兰颈部直径	Welding Neck Diameter 法兰颈部直径	Hub Diameter 法兰颈部直径			Threaded Length 螺纹长度	Threaded Min Length 螺纹最小长度	Threaded Max Length 螺纹最大长度	Slip On Socket 活套法兰	Welding Neck Socket 焊接法兰	Threaded Socket 螺纹法兰	Lapped Min Socket 活套法兰	Welding Neck Socket 焊接法兰	Threaded Socket 螺纹法兰	No. of Holes 孔数	Diameter of Holes 孔径	Welding Neck Socket 焊接法兰	Threaded Socket 螺纹法兰
NPS	O	t <sub>f</sub>	X	G	A	T	D	r	Q	Y	Y	B	B	—	—	—	—	—	—	—
1/2	95	14.3	38	35.1	21.3	16	10	3	23.6	22	52	22.9	22.9	4	16	66.7	0.9	0.9	0.9	
3/4	115	15.9	48	42.9	26.7	16	11	3	29.0	25	57	27.7	28.2	4	19.1	82.5	1.8	1.4	1.4	
1	125	17.5	54	50.8	33.4	18	13	3	35.8	27	62	34.5	34.9	4	19.1	88.9	1.8	1.8	1.8	
1 1/4	135	20.7	64	63.5	42.2	21	14	5	44.4	29	67	43.2	43.7	4	19.1	98.4	2.7	2.3	2.3	
1 1/2	155	22.3	70	73.2	48.3	23	16	6	50.6	32	70	49.5	50.0	4	22.3	114.3	3.6	3.2	3.2	
2	165	25.4	84	91.9	60.3	29	17	8	63.5	37	73	61.9	62.5	8	19.1	127.0	5.4	4.1	4.5	
2 1/2	190	28.6	100	104.6	73.0	32	19	8	76.2	41	81	74.6	75.4	8	22.3	149.2	8.2	5.9	6.8	
3	210	31.8	117	127.0	88.9	35	21	10	92.2	46	83	90.7	91.4	8	22.3	168.3	10.4	7.3	9.1	
3 1/2	230	35.0	133	139.7	101.6	40	—	10	104.9	49	86	103.4	104.1	8	25.4	184.2	11.8	9.5	13.2	
4	275	38.1	152	157.2	114.3	42	—	11	117.6	54	102	116.1	116.8	8	25.4	215.9	19.0	16.8	18.6	
5	330	44.5	189	185.7	141.3	48	—	11	144.4	60	114	143.8	144.4	8	28.6	266.7	31.0	28.6	30.8	
6	365	47.7	222	215.9	168.3	51	—	13	171.4	67	117	170.7	171.4	12	28.6	292.1	36.7	36.3	39.0	
8	420	55.6	273	269.7	219.1	58	—	13	222.2	76	133	221.5	222.2	12	31.2	349.2	54.4	52.2	63.5	
10	510	63.5	343	323.9	273.0	66	—	13	276.2	86	152	276.2	277.4	16	35	431.8	86.2	77.1	104.0	
12	560	66.7	400	381.0	323.8	70	—	13	326.6	92	156	327.0	328.2	20	35	489.0	102.0	90.7	134.0	
14	605	69.9	432	412.8	356.6	74	—	13	360.4	94	165	359.2	360.2	20	38.1	527.0	127.0	104.0	161.0	
16	685	76.2	495	469.9	406.4	78	—	13	411.2	106	178	410.5	411.2	20	41.28	603.2	177.0	150.0	225.0	
18	745	82.6	546	533.4	457.0	80	—	13	462.0	117	184	461.8	462.3	20	44.45	654.0	215.0	181.0	286.0	
20	815	88.9	610	584.2	508.0	83	—	13	512.8	127	185	513.1	514.4	24	44.45	723.9	268.0	231.0	367.0	
24	940	101.6	718	692.2	610.0	93	—	13	614.4	140	184	616.0	616.0	24	50.8	836.2	376.0	331.0	567.0	



ANSI B 16.5 Forged Flange Class 900 锻造法兰 ANSI B 16.5 标准 900#

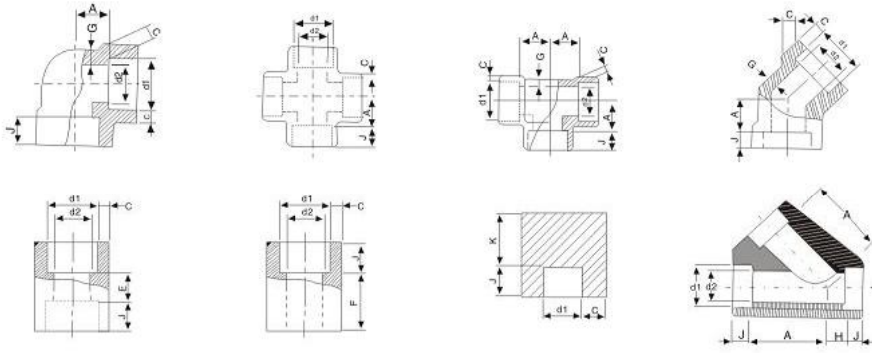
Nominal Pipe Size 公称口径	Outside Diameter 法兰外径	Thickness of Flange 法兰最小厚度	Hub Diameter 法兰颈部直径			Threaded Length 螺纹长度	Threaded Min Length 螺纹最小长度	Threaded Max Length 螺纹最大长度	Length Through Hub 含颈高度			Bore Flange 法兰内径			Drilling Holes 钻孔			Approximate Weight 重量		
			Released Face Diameter 法兰颈部直径	Welding Neck Diameter 法兰颈部直径	Hub Diameter 法兰颈部直径				Threaded Socket 螺纹法兰	Welding Neck Socket 焊接法兰	Threaded Socket 螺纹法兰	Lapped Min Socket 活套法兰	Welding Neck Socket 焊接法兰	Threaded Socket 螺纹法兰	No. of Holes 孔数	Diameter of Holes 孔径	Welding Neck Socket 焊接法兰	Threaded Socket 螺纹法兰	Blind Socket 盲法兰	Lapped Socket 活套法兰
NPS	O	t <sub>f</sub>	X	G	A	T	D	Y	Y	Y	B	B	B	—	—	—	—	—	—	
1/2	95	14.3	38	35.1	21.3	16	10	3	23.6	22	52	22.9	22.9	4	16	66.7	0.9	0.9	0.9	
3/4	115	15.9	48	42.9	26.7	16	11	3	29.0	25	57	27.7	28.2	4	19.1	82.5	1.8	1.4	1.4	
1	125	17.5	54	50.8	33.4	18	13	3	35.8	27	62	34.5	34.9	4	19.1	88.9	1.8	1.8	1.8	
1 1/4	135	20.7	64	63.5	42.2	21	14	5	44.4	29	67	43.2	43.7	4	19.1	98.4	2.7	2.3	2.3	
1 1/2	155	22.3	70	73.2	48.3	23	16	6	50.6	32	70	49.5	50.0	4	22.3	114.3	3.6	3.2	3.2	
2	165	25.4	84	91.9	60.3	29	17	8	63.5	37	73	61.9	62.5	8	19.1	127.0	5.4	4.1	4.5	
2 1/2	190	28.6	100	104.6	73.0	32	19	8	76.2	41	81	74.6	75.4	8	22.3	149.2	8.2	5.9	6.8	
3	210	31.8	117	127.0	88.9	35	21	10	92.2	46	83	90.7	91.4	8	22.3	168.3	10.4	7.3	9.1	
3 1/2	230	35.0	133	139.7	101.6	40	—	10	104.9	49	86	103.4	104.1	8	25.4	184.2	11.8	9.5	13.2	
4	275	38.1	152	157.2	114.3	42	—	11	117.6	54	102	116.1	116.8	8	25.4	215.9	19.0	16.8	18.6	
5	330	44.5	189	185.7	141.3	48	—	11	144.4	60	114	143.8	144.4	8	28.6	266.7	31.0	28.6	30.8	
6	365	47.7	222	215.9	168.3	51	—	13	171.4	67	117	170.7	171.4	12	28.6	292.1	36.7	36.3	39.0	
8	420	55.6	273	269.7	219.1	58	—	13	222.2	76	133	221.5	222.2	12	31.2	349.2	54.4	52.2	63.5	
10	510	63.5	343	323.9	273.0	66	—	13	276.2	86	152	276.2	277.4	16	35	431.8	86.2	77.1	104.0	
12	560	66.7	400	381.0	323.8	70	—	13	326.6	92	156	327.0	328.2	20	35	489.0	102.0	90.7	134.0	
14	605	69.9	432	412.8	356.6	74	—	13	360.4	94	165	359.2	360.2	20	38.1	527.0	127.0	104.0	161.0	
16	685	76.2	495	469.9	406.4	78	—	13	411.2	106	178	410.5	411.2	20	41.28	603.2	177.0	150.0	225.0	
18	745	82.6	546	533.4	457.0	80	—	13	462.0	117	184	461.8	462.3	20	44.45	654.0	215.0	181.0	286.0	
20	815	88.9	610	584.2	508.0	83	—	13	512.8	127	185	513.1	514.4	24	44.45	723.9	268.0	231.0	367.0	
24	940	101.6	718	692.2	610.0	93	—	13	614.4	140	184	616.0	616.0	24	50.8	836.2	376.0	331.0	567.0	

 Use Class 1500 dimensions in these size  
 采用1500级相应规格尺寸









Socket Welding Fittings 承插焊管件 GB/T14383-2008 ASME B16.11

Nominal Pipe Size 公称通径	Min Depth of Socket 承插孔深度	Center to Bottom of Socket 中心至承插孔底部A							Laying Length 结构长度		End Wall Thickness 端壁厚度			Center to Bottom of Socket 中心至承插孔底部 45° Lateral 45° 斜三通				
		90° Elbows Tees and Crosses 90° 弯头、三通、四通 Class Designation 等级代号			45° Elbows 45° 弯头 Class Designation 等级代号				Couplings 双承口管箱	Half Couplings 单承口管箱	K	A		H				
		3000	6000	9000	3000	6000	9000	Sch 80				Sch 160	Sch 80	Sch 160				
		DN	NPS	J	3000	6000	9000	3000	6000	9000	E	F	3000	6000	9000	3000	6000	3000
6	1/8	9.5	11.0	11.0	-	8.0	8.0	-	6.5	16.0	4.8	6.4	-	-	-	-	-	-
8	1/4	9.5	11.0	13.5	-	8.0	8.0	-	6.5	16.0	4.8	6.4	-	-	-	-	-	-
10	3/8	9.5	13.5	15.5	-	8.0	11.0	-	6.5	17.5	4.8	6.4	37	9.5	-	-	-	-
15	1/2	9.5	15.5	19.0	25.5	11.0	12.5	15.5	9.5	22.5	6.4	7.9	11.2	41	51	9.5	11	-
20	3/4	12.5	19.0	22.5	28.5	13.0	14.0	19.0	9.5	24.0	6.4	7.9	12.7	51	60	11	13	-
25	1	12.5	22.5	27.0	32.0	14.0	17.5	20.5	12.5	28.5	9.6	11.2	14.2	60	71	13	16	-
32	1-1/4	12.5	27.0	32.0	35.0	17.5	20.5	22.5	12.5	30.0	9.6	11.2	14.2	71	81	16	17	-
40	1-1/2	12.5	32.0	38.0	38.0	20.5	25.5	25.5	12.5	32.0	11.2	12.7	15.7	81	98	17	21	-
50	2	16.0	38.0	41.0	54.0	25.5	28.5	28.5	19.0	41.0	12.7	15.7	19.0	98	151	21	30	-
65	2-1/2	16.0	41.0	-	-	28.5	-	-	19.0	43.0	15.7	19.0	-	151	-	30	-	-
80	3	16.0	57.0	-	-	32.0	-	-	19.0	44.5	19.0	22.4	-	184	-	57	-	-
100	4	19.0	66.5	-	-	41.0	-	-	19.0	48.0	22.4	28.4	-	201	-	66	-	-

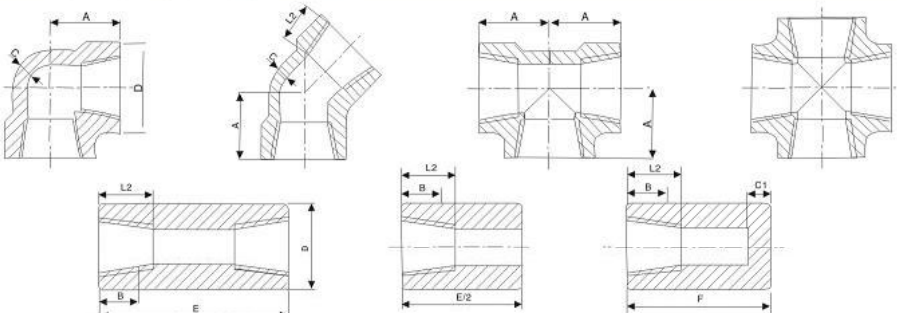
Note: 1) Average of socket wall thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.  
 2) Upper and lower values for each size are the respective maximum and minimum dimensions.  
 3) Above dimensions accord with SH3410, HG/T21634, JIS B2316, BS3799.  
 备注: 1) 承插壁厚外部平均值不低于所列值。最小值仅限于局部区域。  
 2) 每种规格的上下值分别代表最大、最小尺寸。  
 3) 上述尺寸符合SH3410、HG/T21634、JIS B2316、BS3799。

Socket Welding Fittings 承插焊管件 GB/T14383-2008 ASME B16.11

Nominal Pipe Size 公称通径	Socket bore Diameter 承插孔径	Bore diameter of Fitting 流通孔径		Bore wall class designation 流通孔径		Socket wall thickness 承插壁厚																					
		D1	D2	G	G	3000	6000	9000																			
									Avg.	Min.	Avg.	Min.	Avg.	Min.													
DN	NPS	6	1/8	8	1/4	10	3/8	15	1/2	20	3/4	25	1	32	1-1/4	40	1-1/2	50	2	65	2-1/2	80	3	100	4		
6	1/8	11.2	7.6	4.8	3.00	3.18	3.18	3.96	3.43	3.18	3.18	3.78	4.01	4.01	4.67	4.90	5.69	6.07	6.35	6.93	7.92	8.30	9.35	9.35	10.62	11.12	12.12
8	1/4	14.6	10.0	7.1	3.00	3.30	3.30	4.60	4.01	3.30	3.30	4.01	4.37	4.37	5.97	6.27	7.06	7.34	7.62	8.20	9.19	9.57	10.62	10.62	11.88	12.88	13.84
10	3/8	18.0	13.3	9.9	3.00	3.50	3.50	5.03	4.37	3.50	3.50	4.37	4.73	4.73	6.47	6.81	7.60	7.88	8.16	8.74	9.73	10.11	11.16	11.16	12.42	13.42	14.38
15	1/2	22.2	16.6	12.5	3.00	3.73	3.73	5.18	4.37	3.73	3.73	4.67	5.18	5.18	6.97	7.31	8.10	8.38	8.66	9.24	10.23	10.61	11.66	11.66	12.92	13.92	14.88
20	3/4	27.6	21.7	16.3	3.00	3.91	3.91	5.56	4.37	3.91	3.91	4.90	5.56	5.56	7.35	7.69	8.48	8.76	9.04	9.62	10.61	10.99	12.04	12.04	13.30	14.30	15.26
25	1	34.3	27.4	21.5	3.00	4.55	4.55	6.35	4.37	4.55	4.55	5.69	6.35	6.35	8.14	8.48	9.27	9.55	9.83	10.41	11.40	11.78	12.83	12.83	14.09	15.09	16.05
32	1-1/4	43.1	35.8	30.2	3.00	4.85	4.85	6.74	4.37	4.85	4.85	6.07	6.74	6.74	8.53	8.87	9.66	9.94	10.22	10.80	11.79	12.17	13.22	13.22	14.48	15.48	16.44
40	1-1/2	49.2	41.6	34.7	3.00	5.08	5.08	7.01	4.37	5.08	5.08	6.35	7.01	7.01	8.79	9.13	9.92	10.20	10.48	11.06	12.05	12.43	13.48	13.48	14.74	15.74	16.70
50	2	61.7	53.3	43.6	3.00	5.54	5.54	7.67	4.37	5.54	5.54	6.93	7.67	7.67	9.46	9.80	10.59	10.87	11.15	11.73	12.72	13.10	14.15	14.15	15.41	16.41	17.37
65	2-1/2	74.4	64.2	54.2	3.00	7.01	7.01	9.35	4.37	7.01	7.01	8.30	9.35	9.35	11.14	11.48	12.27	12.55	12.83	13.41	14.40	14.78	15.83	15.83	17.09	18.09	19.05
80	3	90.3	79.4	66.4	3.00	7.62	7.62	10.11	4.37	7.62	7.62	8.92	10.11	10.11	11.90	12.24	13.03	13.31	13.59	14.17	15.16	15.54	16.59	16.59	17.85	18.85	19.81
100	4	115.7	103.8	84.2	3.00	8.56	8.56	11.16	4.37	8.56	8.56	9.86	11.16	11.16	12.95	13.29	14.08	14.36	14.64	15.22	16.21	16.59	17.64	17.64	18.90	19.90	20.86

Note: 1) Average of Socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.  
 2) Upper and lower values for each size are the respective maximum and minimum dimensions.  
 3) Above dimensions accord with GB/T 14383, ASME B16.9.  
 备注: 1) 承插壁厚外部平均值不低于所列值。最小值仅限于局部区域。  
 2) 每种规格的上下值分别代表最大、最小尺寸。  
 3) 上述尺寸符合GB/T 14383, ASME B16.9。





Threaded Fittings 螺纹管件 GB/T14626, ASME B16.11, BS3799

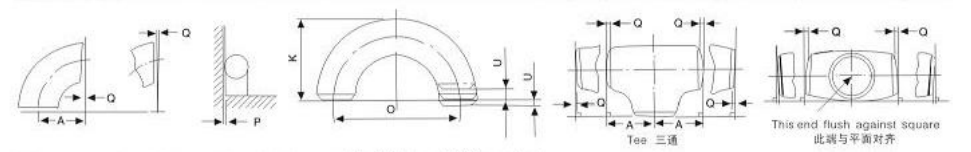
Nominal Pipe Size 公称直径	90° Elbows, Tees and Crosses 90° 弯头、三通、四通						Half Coupling, Coupling, Cap 双接口管箍、单接口管箍、管帽						Length of Thread 螺纹长度									
	Center to End 中心至端面			Outside Diameter 外径	Wall Thickness 壁厚	End to End 全长		Outside Diameter 外径	End Wall Thickness 管帽壁厚													
	90° Elbows, Tees and Crosses 90° 弯头、三通、四通		45° Elbows 45° 弯头			End to End 全长			End Wall Thickness 管帽壁厚													
DN	NPS	2000	3000	6000	2000	3000	6000	2000	3000	6000	2000	3000	6000	3000	6000	3000	6000	3000	6000	B	L2	
6	1/8	21	21	25	17	17	19	22	22	25	3.18	3.18	6.35	32	19	-	16	22	4.8	-	6.4	6.7
8	1/4	21	25	28	17	19	22	22	25	33	3.18	3.30	6.60	35	25	27	19	25	4.8	6.4	8.1	10.2
10	3/8	25	28	33	19	22	25	25	33	38	3.18	3.51	6.98	38	25	27	22	32	4.8	6.4	9.1	10.4
15	1/2	28	33	38	22	25	28	33	38	46	3.18	4.09	8.15	48	32	33	28	38	6.4	7.9	10.9	13.6
20	3/4	33	38	44	25	28	33	38	46	56	3.18	4.32	8.53	51	37	38	35	44	6.4	7.9	12.7	13.9
25	1	38	44	51	28	33	35	46	56	62	3.68	4.98	9.93	60	41	43	44	57	9.7	11.2	14.7	17.3
32	1 1/4	44	51	60	33	35	43	56	62	75	3.89	5.28	10.59	67	44	46	57	64	9.7	11.2	17.0	18.0
40	1 1/2	51	60	64	35	43	44	62	75	84	4.01	5.56	11.07	79	44	48	64	76	11.2	12.7	17.8	18.4
50	2	60	64	83	43	44	52	75	84	102	4.27	7.14	12.09	86	48	51	76	92	12.7	15.7	19.0	19.2
65	2 1/2	76	83	95	52	52	64	92	102	121	5.61	7.85	15.29	92	60	64	92	108	15.7	19.0	23.6	28.9
80	3	86	95	106	64	64	79	109	121	146	5.99	8.84	16.64	108	65	68	108	127	19.0	22.4	25.9	30.5
100	4	106	114	114	79	79	79	146	152	152	6.55	11.18	18.67	121	68	75	140	159	22.4	28.4	27.7	33.0

Nominal Pipe Size 公称直径	Length Min 螺纹长度	Square Head Plugs 方头管塞		Round Head Plugs 圆头管塞		Hex Head Plugs and Bushings 六角头管塞和接头			
		Height of Square Min 方头高度	Width of Flats Min 平面宽度	Diameter of Round Head 圆头直径	Length Min 全长	Width of Flats Nominal 平面宽度	Hex Height Min 六角头高度		
DN	NPS	L2	B	C	D	L	S	K	H
6	1/8	10	6	7	10	35	11	-	6
8	1/4	11.0	6	10	14	41	16	3	6
10	3/8	13	8	11	18	41	18	4	8
15	1/2	14	10	14	21	44	22	5	8
20	3/4	16.0	11	16	27	44	27	6	10
25	1	19.0	13	21	33	51	36	6	10
32	1 1/4	21	14	24	43	51	46	7	14
40	1 1/2	21	16	28	48	51	50	8	16
50	2	22.0	18	32	60	64	65	9	18
65	2 1/2	27.0	19	36	73	70	75	10	19
80	3	28	21	41	89	70	90	10	21
100	4	32.0	25	65	114	76	115	13	25

Note: Above dimensions acc. to GB/T14626, ASME B16.11, BS3799.  
备注: 上述尺寸符合GB/T14626, ASME B16.11, BS3799标准。

Tolerances for Buttwelding Fittings 对焊管件尺寸的极限偏差 Unit: mm

All Fittings 所有管件		Elbows and Tees 90° 和 45° 弯头、三通		Reducers and Stub Ends 异径接头和翻边短节		Caps 管帽		180 Degree Returns 180° 回转弯	
Nominal pipe size 公称尺寸	Outside Diameter at Bevel 坡口处外径	Inside Diameter at End 端部内径	Center to End Dimension 中心至端部尺寸	Over All Length 总长	Over All Length 总长	Over All Length 总长	Center to Center Dimension 中心至中心尺寸	Back to Face Dimension 背面至端面尺寸	Misalignment of End 端面不重合度
NPS	DN	D	A, B, C, M	F, H	E	O	K	U	
1/2-2 1/2	15-65	+1.6 -0.8	±0.8	±2	±3	±6	±6	±1	
3-3 1/2	80-90	1.6	±1.6	±2	±3	±6	±6	±1	
4	100	1.6	±1.6	±2	±3	±6	±6	±1	
5-8	125-200	+2.4 -1.6	±1.6	±2	±6	±6	±6	±1	
10-18	250-450	+4.0 -3.2	±3.2	±2	±6	±10	±6	±2	
20-24	500-600	+6.4 -4.8	±4.8	±2	±6	±10	±6	±2	
26-30	650-750	+8.0 -4.8	±4.8	±3	±6	±10	±6	±2	
32-48	800-1200	+6.4 -4.8	±4.8	±5	±10	-	-	-	



Tolerances for Buttwelding Fittings 对焊管件尺寸的极限偏差 Unit: mm

All Fittings 所有管件		Elbows and Tees 90° 和 45° 弯头、三通		Reducers and Stub Ends 异径接头和翻边短节		Caps 管帽		180 degree Returns 180° 弯头		Lap Joint Stub Ends 翻边短节		Nominal Pipe Size 公称管子规格			Angularity Tolerance 形位公差		
Nominal Pipe Size 公称尺寸 (DN)	Outside diameter at Bevel 坡口处外径	Inside Diameter at End 端部内径	Wall Thickness 壁厚	Center to End Dimension 中心至端部尺寸	Over all length 总长	Over all length 总长	Center to Center Dimension 中心至中心尺寸	Back to Face Dimension 背面至端面尺寸	Outside Diameter of Lap 搭接边外径	Fillet Radius of Lap 搭接边外角圆角半径	Outside Diameter of Lap Joint 短节外径	Thickness of Lap 搭接边厚度	Elbows and Reducers 弯头、三通、异径接头	Elbows and Tees 90° 和 45° 弯头及三通	Misalignment of End 端面不重合度		
15-65	80-90	100	125-200	250-450	500-600	650-750	800	15-100	125-200	250-300	350-400	450-600	650-750	800			
+1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6		
-0.8	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6		
±0.8	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6	±1.6		
±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2		
±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3		
±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6		
±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10		
±1	±1	±1	±1	±1	±1	±1	±1	±1	±1	±1	±1	±1	±1	±1	±1		
±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2		
±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3	±3		
±4	±4	±4	±4	±4	±4	±4	±4	±4	±4	±4	±4	±4	±4	±4	±4		
±5	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5	±5		
±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6	±6		
±7	±7	±7	±7	±7	±7	±7	±7	±7	±7	±7	±7	±7	±7	±7	±7		
±8	±8	±8	±8	±8	±8	±8	±8	±8	±8	±8	±8	±8	±8	±8	±8		
±9	±9	±9	±9	±9	±9	±9	±9	±9	±9	±9	±9	±9	±9	±9	±9		
±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10		

a. Out-of-round is the sum of absolute value of plus and minus tolerance.  
b. This tolerance may not apply in localized areas of formed fittings where increased wall thickness is required to meet design requirements.  
c. The inside diameter and the nominal wall thickness ends are to be specified by the purchaser.  
d. Unless otherwise specified by the purchaser, these tolerances apply to the nominal inside diameter, which equals the difference between the nominal outside diameter and twice the nominal wall thickness.  
A. 圆度为正值公差绝对值之和；  
B. 当需要不得增加管壁厚度以满足抗内压需求时，该公差可能不适用于成型管件的局部区域；  
C. 端部内径和公称壁厚由采购方指定；  
D. 除非采购方另有规定，这些公差适用于公称内径等于公称外径减去两倍公称壁厚的场合。











Weight for Con &amp; Ecc Reducer 异径管重量表

Nominal Size 公称直径		Weight for Con & Ecc Reducer 异径管重量表																										
DN	NPS	OD	SCH10	SCH20	SCH30	STD	SCH40	SCH60	SCH80	XS	SCH100	SCH120	SCH140	SCH160	XXS	SCH5s	SCH10s	SCH40s	STD	SCH5s	SCH10s	SCH40s	STD	SCH5s	SCH10s	SCH40s	STD	
1/2	15	21.3				0.06	0.06	0.06	0.1	0.1					0.12	0.21	0.03	0.04	0.06	0.06	0.07							
3/4	20	26.7				0.09	0.09	0.09	0.12	0.12					0.17	0.27	0.05	0.09	0.09	0.09	0.1							
1	25	33.4				0.14	0.14	0.14	0.17	0.17					0.22	0.34	0.06	0.15	0.12	0.12	0.16							
1 1/4	32	42.2				0.2	0.2	0.2	0.24	0.24					0.3	0.42	0.07	0.19	0.19	0.19	0.27							
1 1/2	40	48.3				0.26	0.26	0.26	0.33	0.33					0.6	0.79	0.12	0.28	0.28	0.28	0.4							
2	50	60.3				0.41	0.41	0.41	0.54	0.54					1.04	1.26	0.16	0.42	0.42	0.42	0.61							
2 1/2	65	73				0.73	0.73	0.73	0.94	0.94					1.65	2.26	0.3	0.6	0.74	0.74	0.9							
3	80	88.9				0.98	0.98	0.98	1.29	1.29					2.4	3.12	0.37	0.74	0.98	1.3								
3 1/2	90	101.6				1.38	1.38	1.38	1.85	1.85					3.02	4.38	0.52	1.1	1.45	2.13	3.07							
4	100	114.3				1.64	1.64	1.64	2.21	2.21					6.09	7.41	0.68	1.1	1.32	2.5	3.77	5.57						
5	125	141.3				2.72	2.72	2.72	3.78	3.78					8.65	10.78	1.26	1.45	1.75	3.57	5.71	8.37						
6	150	168.3				3.93	3.93	3.93	5.72	5.72					11.44	14.27	2.26	2.85	3.57	7.19	10.99	16.35	25.11					
8	200	219.1				4.92	5.43	6.31	7.95	9.26	9.26	9.53	14.99	15.91	18.43	17.88	2.01	2.85	5.71	9.24	14.92							
10	250	273				7.89	8.83	10.5	13.5	18.1	14.2	21.65	25.9	29.27	32.5	29.27	3.59	4.21	9.58	14.22	24.15							
12	300	323.8				11.1	13.37	15.2	17.8	24.33	29.48	19.8	35.7	41.73	46.45	53.31	41.73	5.83	6.55	14.7	19.48	38.73						
14	350	355.6	19.18	25.56	28.8	28.8	35.55	47.65	59.74	37.7	73.32	84.5	95.37	105.96														
16	400	406.4	24.53	30.49	35.2	35.2	48.28	62.52	79.68	46.3	95.87	111.93	130.45	143.06														
18	450	457	29.04	36.13	49.82	42.7	64.15	84.68	104.76	55.8	127.46	149.63	168.07	189.08														
20	500	508	42.72	64.5	84.4	64.5	98.74	133.46	167.52	84.4	205.41	237.71	350	370														
22	550	559	52.28	71.3	91.7	71.3	158.33	201.18	99.4	242.93	320	390	475															
24	600	610	55.95	75.8	113.51	75.8	134.79	187.56	233.39	99.9	289.11	394	570	610														
26	650	660	75.45	123		98					123																	
28	700	711	79.3	132	168	105					132																	
30	750	762	83.2	143	181	113	207.5				143																	
32	800	813	95.7	150	194	121	236.88				150																	
34	850	864	102.56	157	207	129	241.87				157																	
36	900	914	113.09	172	218	136					172																	
38	950	965				143					186																	
40	1000	1016				151					193																	
42	1050	1067				159					209																	
44	1100	1118				163					217																	
46	1150	1168				182					225																	
48	1200	1219				187					247																	

Weight for Cap 管帽重量表(KGS)

Nominal Size 公称直径		Weight for Cap 管帽重量表(KGS)																											
DN	NPS	OD	SCH10	SCH20	SCH30	STD	SCH40	SCH60	SCH80	XS	SCH100	SCH120	SCH140	SCH160	XXS	SCH5s	SCH10s	SCH40s	STD	SCH5s	SCH10s	SCH40s	STD	SCH5s	SCH10s	SCH40s	STD		
1/2	15	21.3	-	-	-	0.05	0.05	-	0.07	0.07	-	-	-	-	0.11	0.15	0.036	0.04	0.046	0.05									
3/4	20	26.7	-	-	-	0.06	0.06	-	0.09	0.09	-	-	-	-	0.13	0.17	0.049	0.052	0.059	0.086									
1	25	33.4	-	-	-	0.1	0.1	-	0.13	0.13	-	-	-	-	0.15	0.2	0.052	0.09	0.106	0.143									
1 1/4	32	42.2	-	-	-	0.14	0.14	-	0.19	0.19	-	-	-	-	0.23	0.3	0.065	0.11	0.141	0.193									
1 1/2	40	48.3	-	-	-	0.2	0.2	-	0.23	0.23	-	-	-	-	0.3	0.35	0.076	0.127	0.169	0.234									
2	50	60.3	-	-	-	0.25	0.25	-	0.3	0.3	-	-	-	-	0.55	0.6	0.099	0.165	0.234	0.331									
2 1/2	65	73	-	-	-	0.35	0.35	-	0.45	0.45	-	-	-	-	0.9	1	0.161	0.232	0.42	0.534									
3	80	88.9	-	-	-	0.7	0.7	-	0.85	0.85	-	-	-	-	1.45	1.8	0.254	0.367	0.66	0.888									
3 1/2	90	101.6	-	-	-	1	1	-	1.3	1.3	-	-	-	-	-	-	0.355	0.512	0.97	1.36									
4	100	114.3	-	-	-	1.1	1.1	-	1.6	1.6	-	2.5	-	2.75	3.5	0.41	0.594	1.17	1.51										
5	125	141.3	-	-	-	2	2	-	2.7	2.7	-	4	-	5	5.5	0.817	1	1.93	2.81										
6	150	168.3	-	-	-	3	3	-	4.4	4.4	-	6	-	7.5	8.1	1.13	1.39	2.9	4.23										
8	200	219.1	-	-	-	4.5	5	5.5	7	8.35	8.35	11	12.27	13.85	19.49	14.91	1.76	2.49	4.76										
10	250	273	-	-	-	6	8	9	13.6	16.25	13.6	21	24.74	29.31	32.98	29.31	3.36	3.84	8.92	11.13									
12	300	323.8	-	-	-	10	13	15	19	25.5	29.5	22.5	32.5	41	46.12	53.77	41	5.47	6.15	14.1	17.94								
14	350	355.6	14	14	16	16	24.5	32.1	40.39	27	50	58.91	67.3	75.7	-	7.19	7.85	16.35	21.11										
16	400	406.4	18	18	21	21	31.5	40.76	52.25	31.5	64	75.57	89.16	98.83	-	10.99	9.56	18.6	25.73										
18	450	457	22	22	30	26	42	66	72.5	36	75	88	93	104	-	13.92	12.1	23.54	32.57										
20	500	508	29	32	42	32	56.75	77.62	98.5	42	122.46	143.56	153	170	-	17.19	17.9	29.06	40.21										
22	550	559	35.5	39	51	39	-	89.1	126	51	154	182.04	210	240	-	19.21	22.6	38.8	51.7										
24	600	610	42	46	74.5	46	96.5	120	150	30	185.66	219.65	250	285	-	27.43	30.15	41.85	57.86										
26	650	660	45.5	66.1	-	49.8	-	-	-	66.1	-	-	-	-	-	-	-	-	-	-									
28	700	711	52.6	74.81	93.5	56	-	-	-	74.81	-	-	-	-	-	-	-	-	-	-									
30	750	762	54.68	82.8	103.5	62	128.55	-	-	82.8	-	-	-	-	-	-	-	-	-	-									
32	800	813	56.6	93.4	116.75	68	133.4	-	-	93.4	-	-	-	-	-	-	-	-	-	-									
34	850	864	60.4	96.91	121.15	72.6	147.3	-	-	96.91	-	-	-	-	-	-	-	-	-	-									
36	900	914	66.05	107	133.75	79.4	-	-	-	107	-	-	-	-	-	-	-	-	-	-									
38	950	965	-	-	-	86.2	-	-	-	124.7	-	-	-	-	-	-	-	-	-	-									
40	1000	1016	-	-	-	95.3	-	-	-	129.3	-	-	-	-	-	-	-	-	-	-									
42	1050	1067	-	-	-	104	-																						



**FOR GED FLANGE TOLERANCES** Millimeters in brackets

Dimension		WELDING NECK & SOCK .WELD	SLIP-ON & SOCK. WELD	THREADED	LAP JOINT	BLIND
1 Outside Diameter	Flange O.D.24 or less(609.6) Flange O.D. over 24(609.6)	±0.06(1.6) ±0.12(3.2)	±0.06(1.6) ±0.12(3.2)	±0.06(1.6) ±0.12(3.2)	±0.06(1.6) ±0.12(3.2)	±0.06(1.6) ±0.12(3.2)
Bore	NPS 10(DN 250) & less	±0.03(0.8)2	+0.03(0.8)4 -0	+0.03(0.8) -0	+0.03(0.8) -0	
	NFS 12-18(DN 300-450)	±0.06(1.6)2	+0.06(1.6)4 -0	+0.6(1.6) -0	+0.6(1.6) -0	
	NPS 20(DN 500) & over	+0.12 (3.2)2 -0.06(1.6)	+0.06(1.6)4 -0	+0.6(1.6) -0	+0.6(1.6) -0	
Flange Thickness	NPS 18(DN 450)& less	+0.12(3.2) -0	+0.12(3.2) -0	+0.12(3.2) -0	+0.12(3.2) -0	+0.12(3.2) -0
	NPS 20(DN 500)& over	+0.19(4.8) -0	+0.19(4.8) -0	+0.19(4.8) -0	+0.19(4.8) -0	+0.19(4.8) -0
Raised Face Diameter	0.06(1.6) raised face 0.25(6.4) raised face	±0.03(0.8) ±0.02(0.5)	±0.03(0.8) ±0.02(0.5)	±0.03(0.8) ±0.02(0.5)	±0.03(0.8) ±0.02(0.5)	±0.03(0.8) ±0.02(0.5)
Drilling	Bolt circle Bolt hole spacing	±0.06(1.6) ±0.03(0.8)	±0.06(1.6) ±0.03(0.8)	±0.06(1.6) ±0.03(0.8)	±0.06(1.6) ±0.03(0.8)	±0.06(1.6) ±0.03(0.8)
Eccentricity <sup>3</sup>	NPS2 1/2(DN65) & less NPS3(DN 80) & larger	0.03(0.8)max 0.06(1.6)max	0.03(0.8)max 0.06(1.6)max	0.03(0.8)max 0.06(1.6)max	0.03(0.8)max 0.06(1.6)max	0.03(0.8)max 0.06(1.6)max
Length Thru Hub	NPS 10(DN 250) & Less NPS 12(DN 300) & over	±0.06(1.6) +0.12(3.2)	±0.06(1.6) ±0.12(3.2)	±0.06(1.6) +0.12(3.2)	±0.06(1.6) +0.12(3.2)	±0.06(1.6) +0.12(3.2)
1 Diameter of Hub at Base	NPS 12 (DN 300) & less	+0.09(2.4) -0.06(1.6)	+0.09(2.4) -0.06(1.6)	+0.09(2.4) -0.06(1.6)	+0.09(2.4) -0.06(1.6)	
	NPS 14(DN 350) & over	±0.12(3.2)	±0.12(3.2)	±0.12(3.2)	±0.12(3.2)	
Diameter of Hub at Bevel	NPS 5(DN125) & less	+0.09(2.4) -0.03(0.8)				
	NPS 6 (DN 150) & over	+0.16(4.0) -0.03(0.8)				
Thickness of Hub at Bevel All sizes of welding neck		Minimum, -12 1/2% of matching nominal pipe wall thickness				

- 1 These tolerances not covered by ANSIB 16.5.
- 2 Welding Neck and Socket Welding small bore.
- 3 Between bolt circle diameter and machined facing diameter
- 4 Socket welding Socket

**Tolerances for socket - welding fittings** 承插式管件尺寸的极限公差

Unit: mm

Nominal Pipe Size 公称口径	All Fittings 所有管件		45° ,90° Elbows, Tees Crosses, 45° Laterals 45° , 90° 弯头、三通、 四通、45° 斜三通	Couplings 双承口管箍	Half Couplings Reducer Inserts 单承口管箍 异径插入件	Unions (Including Thread) 活接头 (含螺纹)	
	Socket Bore 承插孔径	Water Way Bore 流通孔径	Center to Bottom of Socket 中心至承插孔底	Laying Lengths 结构长度	Laying Lengths 结构长度	Length Assembly Nominal 公称装配长度	
DN	NPS	d1	d2	A, H	E	F	L
6-8	1/8-1/4	+4, -1	+1.5, -0	± 1.0	± 1.5	± 1.0	± 1.5
10-20	3/8-3/4	+4, -1	+1.5, -1	± 1.5	± 3.0	± 1.5	± 1.5
25-40	1-1 1/2	+4, -1	+1.5, -2	± 2.0	± 4.0	± 2.0	± 1.5
50	2	+0.5, -0	+1.5, -3	± 2.0	± 4.0	± 2.0	± 1.5
65-100	2 1/2-4	+0.5, -0	+3, -0	± 2.5	± 5.0	± 2.5	± 1.5

**Tolerances for Threaded Fittings** 螺纹管件尺寸的极限公差

Unit: mm

Nominal Pipe Size 公称口径		45° ,90° Elbows, Tees Crosses, 45° Laterals 45° , 90° 弯头、三通、 四通、45° 斜三通	Couplings, Cap 双接口管箍、管帽 End to End 端面至端面	Half Couplings, Boss 单接口管箍、半管接头 End to End 端面至端面
DN	NPS	A	E, F	E/2
6-8	1/8-1/4	± 1.0	± 1.0	± 1.0
10-20	3/8-3/4	± 1.5	± 1.5	± 1.5
25-40	1-1 1/2	± 2.0	± 2.0	± 2.0
50	2	± 2.0	± 2.0	± 2.0
65-100	2 1/2-4	± 2.5	± 2.5	± 2.5

Note: Limiting tolerances can be slightly different between different standards and codes.  
注: 极限公差在不同标准中可能会略有差异。

The Correlation of Thread and Socket - Welding Fittings with Pressure Class Designation of Schedule No. of Pipe  
螺纹、承插焊管件压力等级与管子壁厚等级的关系

Code of Pressure Grade 压力等级代号	Wall Thickness Class 管子壁厚等级			
	Socket 承插	Thread 螺纹	Socket 承插	Thread 螺纹
2000	-	sch80	-	XS
3000	sch80	sch160	XS	-
6000	sch160	-	-	XXS
9000	-	-	XXS	-



The General Material for Chinese Pressure Pipe Fittings 中国压力容器管道常用材料

Variety 钢种	Grade 牌号	Standard and Code 标准号	Type 类型	Chemical Composition%, max 化学成分											Mechanical Properties 力学性能			
				C	Si	Mn	Cr	Ni	Mo	P	S	Other	Mpa min	Mpa max	HB min	HB max	Other	
Carbon Steel 碳钢	20	GB/T699	BAR棒	0.17-0.23	0.17-0.37	0.35-0.65	0.25	0.30	-	0.035	0.035	Cu:0.25	410	245	25	156	%:55	
	20	GB/T3087	PIPE管	0.17-0.23	0.17-0.37	0.35-0.65	0.25	0.30	-	0.035	0.035	Cu:0.25	410-550	245	20	-	-	
	20	GB/T163	PIPE管	0.17-0.23	0.17-0.37	0.35-0.65	0.25	0.30	-	0.035	0.035	Cu:0.25	410-530	245	20	-	-	
	20	GB9948	PIPE管	0.17-0.23	0.17-0.37	0.35-0.65	0.25	0.25	0.15	0.030	0.020	Cu:0.20 V:0.08	410-550	245	24	-	AkvJ:35	
	20	GB711	PLATE板	0.17-0.23	0.17-0.37	0.35-0.65	0.20	0.30	-	0.035	0.035	Cu:0.25	410	-	28	-	-	
	20G	GB5310	PIPE管	0.17-0.23	0.17-0.37	0.35-0.65	0.25	0.25	0.15	0.030	0.030	Cu:0.20 V:0.08	410-550	245	24	-	AkvJ:40	
	20	GB6479	PIPE管	0.17-0.24	0.17-0.37	0.35-0.65	0.25	0.25	0.15	0.030	0.030	Cu:0.20 V:0.08	410-550	245	24	-	AkvJ:39	
	Q245R	GB713	PLATE板	0.20	0.35	0.50-1.00	-	-	-	0.025	0.015	Alt≥0.020	400-520	245	25	-	AkvJ31 akuj/cm2.29	
	Q235A	GB3274	PLATE板	0.14-0.22	0.30	0.30-0.65	-	-	-	0.045	0.050	-	375-500	235	26	-	-	
	Q235B	GB3274	PLATE板	0.12-0.20	0.30	0.30-0.70	-	-	-	0.045	0.045	-	375-500	235	26	-	AkvJ:27	
Alloy Steel 合金钢	1Cr5Mo	GB1221	BAR棒	0.15	0.50	0.60	4.00-6.00	0.60	0.45-0.60	0.035	0.030	-	590	390	18	-	-	
	1Cr5Mo	GB6479	PIPE管	0.15	0.50	0.60	4.00-6.00	0.60	0.45-0.60	0.030	0.030	Cu:0.20	390-590	195	22	-	Aku2J:94	
	1Cr5Mo	GB9948	PIPE管	0.15	0.50	0.60	4.00-6.00	0.60	0.45-0.60	0.030	0.020	-	390-590	195	22	187	AkvJ:35	
	12Cr2Mo	GB/T3077	BAR棒	0.08-0.15	0.17-0.37	0.40-0.70	0.40-0.70	0.30	0.40-0.55	0.035	0.035	Cu:0.30	410	265	24	179	%60:Aku2J:110	
	12Cr2Mo	GB6479	PIPE管	0.08-0.15	0.17-0.37	0.40-0.70	0.40-0.70	0.30	0.40-0.55	0.030	0.030	Cu:0.20	410-560	205	21	-	AkvJ:55	
	12Cr2Mo	GB9948	PIPE管	0.08-0.15	0.17-0.37	0.40-0.70	0.40-0.70	0.30	0.40-0.55	0.030	0.020	Cu:0.20	410-560	205	21	156	AkvJ:35	
	12CrMoG	GB5310	PIPE管	0.08-0.15	0.17-0.37	0.40-0.70	0.40-0.70	0.30	0.40-0.55	0.025	0.015	Cu:0.20 V:0.08	410-560	205	21	-	AkvJ:40	
	12Cr1MoV	GB/T3077	BAR棒	0.08-0.15	0.17-0.37	0.40-0.70	0.90-1.20	0.30	0.25-0.35	0.035	0.035	N:0.15-0.30 Cu:0.30	490	245	22	179	%50:Aku2J:71	
	12Cr1MoVG	GB5310	PIPE管	0.08-0.15	0.17-0.37	0.40-0.70	0.90-1.20	0.30	0.25-0.35	0.025	0.010	N:0.15-0.30 Cu:0.20	470-640	255	21	-	AkvJ:40	
	12Cr1MoVR	GB713	PLATE板	0.08-0.15	0.15-0.40	0.40-0.70	0.90-1.20	-	0.25-0.35	0.025	0.010	V:0.15-0.30	440-590	245	19	-	AkvJ:34	
Austenitic Stainless Steel 奥氏体 不锈钢	0Cr17Ni14Mo2	GB/T14976	PIPE管	0.08-0.15	0.50	0.40-0.70	2.00-2.50	0.30	0.90-1.20	0.030	0.030	Cu:0.20	450-600	280	20	-	Aku2J:38	
	12Cr2MoG	GB5310	PIPE管	0.08-0.15	0.50	0.40-0.60	2.00-2.50	0.30	0.90-1.30	0.025	0.015	Cu:0.20 V:0.08	450-600	280	22	-	AkvJ:40	
	15Cr2Mo	GB/T3077	BAR棒	0.12-0.18	0.17-0.37	0.40-0.70	0.80-1.10	0.30	0.40-0.55	0.035	0.035	Cu:0.30	440	295	22	179	%60:Aku2J:94	
	15Cr2Mo	GB6479	PIPE管	0.12-0.18	0.17-0.37	0.40-0.70	0.80-1.10	0.30	0.40-0.55	0.030	0.030	Cu:0.20	440-640	235	21	-	Aku2J:47	
	15Cr2Mo	GB9948	PIPE管	0.12-0.18	0.17-0.37	0.40-0.70	0.80-1.10	0.30	0.40-0.55	0.030	0.020	Cu:0.20	440-640	235	21	170	AkvJ:35	
	15CrMoG	GB5310	PIPE管	0.12-0.18	0.17-0.37	0.40-0.70	0.80-1.10	0.30	0.40-0.55	0.025	0.015	Cu:0.20 V:0.08	440-640	295	21	-	AkvJ:40	
	15CrMoR	GB713	PLATE板	0.12-0.18	0.15-0.40	0.40-0.70	0.80-1.20	-	0.45-0.60	0.025	0.010	-	450-590	295	19	-	AkvJ:31	
	Biphase Stainless Steel 双相不锈钢	022Cr17Ni12Mo2	GB1220	BAR棒	0.030	1.00	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	-	480	175	40	187	%:60
		022Cr17Ni12Mo2	GB4237	PLATE板	0.030	0.75	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	N:0.10	485	170	40	217	-
		00Cr17Ni14Mo2	GB/T14976	PIPE管	0.030	1.00	2.00	16.00-18.00	12.00-15.00	2.00-3.00	0.035	0.030	-	480	175	35	-	-
022Cr19Ni10		GB1220	BAR棒	0.030	1.00	2.00	18.00-20.00	8.00-12.00	-	0.045	0.030	-	480	175	40	187	%:60	
022Cr19Ni10		GB4237	PLATE板	0.030	0.75	2.00	18.00-20.00	8.00-12.00	-	0.045	0.030	N:0.10	485	170	40	201	-	
00Cr19Ni10		GB/T14976	PIPE管	0.030	1.00	2.00	18.00-20.00	8.00-12.00	-	0.035	0.030	-	480	175	35	-	-	
06Cr17Ni12Mo2		GB1220	BAR棒	0.08	1.00	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	-	520	205	40	187	%:60	
06Cr17Ni12Mo2		GB4237	PLATE板	0.08	0.75	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	N:0.10	515	205	40	217	-	
0Cr17Ni12Mo2		GB/T14976	PIPE管	0.08	1.00	2.00	16.00-18.50	10.00-14.00	2.00-3.00	0.035	0.030	-	520	205	35	-	-	
06Cr19Ni10		GB1220	BAR棒	0.08	1.00	2.00	18.00-20.00	8.00-11.00	-	0.045	0.030	-	520	205	40	187	%:60	
06Cr19Ni10	GB4237	PLATE板	0.08	0.75	2.00	18.00-20.00	8.00-10.50	-	0.045	0.030	-	515	205	40	201	-		
0Cr18Ni9	GB/T14976	PIPE管	0.07	1.00	2.00	17.00-19.00	8.00-11.00	-	0.035	0.030	-	520	205	35	-	-		
Low Temperature Steel 低温钢	06Cr18Ni11Ti	GB1220	BAR棒	0.08	1.00	2.00	17.00-19.00	9.00-12.00	-	0.045	0.030	Ti:5C-0.7	520	205	40	187	%:50	
	06Cr18Ni11Ti	GB4237	PLATE板	0.08	0.75	2.00	17.00-19.00	9.00-12.00	-	0.045	0.030	Ti:5C Ni:0.10	515	205	40	217	-	
	0Cr18Ni10Ti	GB/T14976	PIPE管	0.08	1.00	2.00	17.00-19.00	9.00-12.00	-	0.035	0.030	Ti:5C	520	205	35	-	-	
	0Cr18Ni12Mo3Ti	GB1220	BAR棒	0.08	1.00	2.00	16.00-18.00	10.00-14.00	1.80-2.50	0.045	0.030	Ti:5C	530	205	40	187	%:55	
	0Cr18Ni12Mo3Ti	GB4237	PLATE板	0.08	0.75	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	Ti:5C	515	205	40	217	-	
	0Cr18Ni12Mo2Ti	GB/T14976	PIPE管	0.08	1.00	2.00	16.00-19.00	11.00-14.00	1.80-2.50	0.035	0.030	Ti:5C-0.7	550	205	35	-	-	
	12Cr18Ni9	GB4237	PLATE板	0.15	0.75	2.00	17.00-19.00	8.00-10.00	-	0.045	0.030	N:0.10	515	205	40	201	-	
	02Cr26Ni5Mo2	GB/T14976	PIPE管	0.08	1.00	1.50	23.00-26.00	3.00-6.00	1.00-3.00	0.035	0.030	-	590	390	18	-	-	
	00Cr18Ni5Mo3Si2	GB1220	BAR棒	0.030	1.30-2.00	1.00-2.00	16.00-19.50	4.50-5.50	2.50-3.00	0.035	0.030	N:0.05-0.12	590	390	20	-	%:40	
	09MnNDR	GB5310	PLATE板	0.12	0.15-0.50	1.20-1.60	0.25	0.30-0.80	0.08	0.020	0.012	Nb:0.04-0.15 Al:0.020	440-570	300	23	-	AkvJ:34	
Low Temperature Steel 低温钢	16Mn	GB6479	PIPE管	0.12-0.20	0.20-0.60	1.20-1.60	0.30	0.30	-	0.030	0.030	Cu:0.20	490-670	320	21	-	AkvJ:47	
	Q345R	GB713	PLATE板	0.20	0.55	1.20-1.60	-	-	-	0.025	0.015	Alt≥0.020	510-640	345	21	-	AkvJ:34	
	16MnDR	GB5310	PLATE板	0.20	0.15-0.50	1.20-1.60	0.25	0.40	0.08	0.025	0.012	Cu:0.25 Alt:0.020	490-620	315	21	-	AkvJ:34	

The General Material for Chinese Pressure Pipe Fittings 中国压力容器管道常用材料

Variety 钢种	Grade 牌号	Standard and Code 标准号	Type 类型	Chemical Composition%, max 化学成分											Mechanical Properties 力学性能			
				C	Si	Mn	Cr	Ni	Mo	P	S	Other	Mpa min	Mpa max	HB min	HB max	Other	
Austenitic Stainless Steel 奥氏体 不锈钢	022Cr17Ni12Mo2	GB1220	BAR棒	0.030	1.00	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	-	480	175	40	187	%:60	
	022Cr17Ni12Mo2	GB4237	PLATE板	0.030	0.75	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	N:0.10	485	170	40	217	-	
	00Cr17Ni14Mo2	GB/T14976	PIPE管	0.030	1.00	2.00	16.00-18.00	12.00-15.00	2.00-3.00	0.035	0.030	-	480	175	35	-	-	
	022Cr19Ni10	GB1220	BAR棒	0.030	1.00	2.00	18.00-20.00	8.00-12.00	-	0.045	0.030	-	480	175	40	187	%:60	
	022Cr19Ni10	GB4237	PLATE板	0.030	0.75	2.00	18.00-20.00	8.00-12.00	-	0.045	0.030	N:0.10	485	170	40	201	-	
	00Cr19Ni10	GB/T14976	PIPE管	0.030	1.00	2.00	18.00-20.00	8.00-12.00	-	0.035	0.030	-	480	175	35	-	-	
	06Cr17Ni12Mo2	GB1220	BAR棒	0.08	1.00	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	-	520	205	40	187	%:60	
	06Cr17Ni12Mo2	GB4237	PLATE板	0.08	0.75	2.00	16.00-18.00	10.00-14.00	2.00-3.00	0.045	0.030	N:0.10	515</					







Carbon, Alloy and Stainless Steel  
各国常用碳钢、合金钢、不锈钢材料对照表

CN	Grade	DIN Designation	UNS	ANSI	AFNOR	BS	ISO
中国	德国	原联邦德国	美国	美国	法国	英国	国际标准
Y1Cr13	1.4005	x12 CrS 13	S41600	416	Z 12 CF 13	416 S 21	7
1Cr13	1.4006	x10 Cr 13	S41000	410	Z 12 C 13	410 S 21	3
1Cr17	1.4016	x8 Cr 17	S43000	430	Z 8 C 17	430 S 15	8
2Cr13	1.4021	x20 Cr 13	S42000	420	Z 20 C 13	420 S 37	4
3Cr13	1.4034	x46 Cr 16	-	-	Z 15 CN 16.02	(420 S 45)	5
1Cr17Ni2	1.4057	x22 CrNi 1.7	S43100	431	Z 15 CN 162	431 S 29	9
Y1Cr17	1.4104	x12 CrMoS 17	S43020	430F	Z 10 CF 17	(441 S 29)	8a
8Cr17	1.4112	x90CrMoV 18	S44003	440	Z 10 CD 17	-	-
-	1.4122	x35CrMo17	-	-	-	-	-
0Cr19Ni9 (0Cr18Ni9)	1.4301	x2 Cr Ni 18 9	S30400	304	Z 2 CN 18.09	304 S 15	11
Y1Cr17Ni9	1.4305	x10 Cr NiS 18 9	S30300	303	Z 10 CNF 18.09	303 S 21	17
00Cr19Ni10 (00Cr18Ni10)	1.4306	x2 Cr NiN 18 10	S30403	304L	Z 2 CN 18.09	304 S 12	10
1Cr17Ni7	1.4310	x12 CrNi 17 88	S30100	301	Z 12 CN 17.07	301 S 21	14
0Cr17Ni12Mo2	1.4401	x2 CrNiMo 18 12	S31600	316	Z 2 CND 17.12	316 S 16	20,20a
00Cr17Ni14Mo2	1.4404	x2 CrNiMo 17 13 2	S31603	316L	Z 2 CND 17.12	316 S 12	19,19a
00Cr17Ni14Mo2	1.4435	x2 CrNiMo 18 14 3	S31603	316L	Z 2 CND 17.13	316 S 12	19,19a
00Cr17Ni12Mo2	1.4436	x5 CrNiMo 17 13 3	S31600	316	Z 6 CND 17.12	316 S 16	20,20a
00Cr19Ni13Mo3 (00Cr17Ni14Mo3)	1.4438	x10CrNiMo18 9	S31703	317L	Z 2 CND 19.15	317 S 12	24
-	1.4439	x2 CrNiMoN 17 13 5	-	317LNM	-	-	-
0Cr19Ni13Mo3	1.4449	x2 CrNiMo 18 16	S31700	317	Z 2 CN 19.15	317 S 16	25
0Cr26Ni5Mo2	1.4460	x8 CrNiMo 27 5	S32900	329	-	-	-
-	1.4462	x2 CrNiMoN 22 5	S31803	-	Z 5 CND 21.08	-	-
-	1.4539	x2 NiCrMoCu 25 20 5	N08904	-	Z1 NCDU 25.20	-	-
0Cr18Ni10Ti (0Cr18Ni9Ti)	1.4541	x6 CrNiTi 18 10	S32100	321	Z 6 CNT 18.10	321 S 12	15
0Cr18Ni11Nb	1.4550	x10 CrNiNb 18 9	S34700	347	Z 6 NNB 18.10	347 S 17	16
0Cr18Ni12Mo2Ti	1.4571	x6 CrNiMoTi 17 12 2	S31635	316Ti	Z 6 CNDT 17.12	320 S 17	-
-	1.4713	x10 CrAl 7	-	-	Z 8 CA 7	-	-
-	1.4724	x10 CrAl 13	-	-	-	-	-
-	1.4742	x10 CrAl 18	-	-	Z 10 CAS 18	-	-
1Cr25Ti	1.4762	x10 CrAl 24	(S 44600)	(446)	Z 10 CAS 24	-	-
-	1.4821	x20 CrNiSi 25 4	-	-	-	-	-
-	1.4828	x15 CrNiSi 20 12	(S 30900)	(309)	Z 15 CNS 20.12	(309 S 24)	-
-	1.4841	x15 CrNiSi 25 20	S31400	314	Z 12 CNS 25.20	-	-
0Cr25Ni20	1.4845	x12 CrNi 25 21	S31008	304	Z 12 CN 25.20	310 S 24	-
-	1.4864	x12 CrNiSi 36 16	N08330	330	(Z12NC 37.18)	-	-
-	1.4876	x10 CrNiAlTi 32 20	-	-	Z 8 NC 32.21	3076 NA 15H	-
0Cr18Ni10Ti (0Cr18Ni9Ti)	1.4878	x12CrNiTi 18 9	S32100	321	Z 6 CNT 18.12	321 S 20	15
-	2.4068	LC Ni 99.2	-	B160	-	-	-
-	2.4360	Ni Cu 30Fe	-	B164	-	3076NA13	-
-	2.4375	Ni Cu 30Al	-	-	-	3076NA18	-
-	2.4610	Ni Mo 16 Cr 16 Ti	-	-	-	3076NA45	-
-	2.4816	Ni Cr 15 Fe	-	B166	-	3076NA14	-
-	2.4856	Ni Cr 21 Mo	-	-	-	3076NA43	-

Manufacturing Standards of common Use Products  
常用产品制造标准

Standard Code 标准代号	Standard Name 标准名称
GB/T12459	Steel butt-welding seamless pipe fittings 钢制对焊无缝管件
GB/T13401	Steel plate butt-welding pipe fittings 钢板制对焊管件
GB/T14383	Forged steel socket welding pipe fittings 锻钢制承插管件
GB/T14626	Forged steel threaded pipe fittings 锻钢制螺纹管件
SH3065	Technical standard for elbows and returns in petro-chemical tubular heater 石油化工管式炉急弯管管技术标准
SH3406	Steel pipe flanges for petrochemical industry 石油化工管制法兰
SH3408	Steel butt-welded seamless fittings 钢制对焊无缝管件
SH3409	Steel plate butt-welding fittings 钢板制对焊管件
SH3410	Forged steel socket-welding pipe fittings 锻钢制承插焊管件
HGJ 10	Forged steel socket-welding fittings 锻钢承插焊管件
HGJ514	Carbon steel, low-alloy steel butt-welding seamless fittings 碳钢、低合金钢无缝对焊管件
HGJ528	Steel plate butt-welding fittings 钢制有缝对焊管件
HGJ529	Forged steel socket-welding threaded and butt-welding outlet 锻钢承插焊螺纹和对焊接管台
HG20592-20635	Steel pipe flanges, gaskets and fasteners 钢管制法兰、垫片、紧固件
GD-2000	Typical designing manual of pipe parts for thermal power plant 火力发电厂水气管道零件及部件典型设计手册
DL/T515	Bends for power plant 电站弯管
SY5257	Steel bends 钢制弯管
DL/T695	Steel pipe butt welding fittings for power plant 电站钢管制对焊管件
SY/T0510	Steel butt-welding pipe fittings 钢制对焊管件

Standard Code 标准代号	Standard Name 标准名称
ISO3419	Non-alloy Steel and alloy steel butt-welding fittings 非合金钢和合金钢对焊管件
ISO5251	Stainless steel butt-welding fittings 不锈钢对焊管件
ASME B16.9	Factory-made Wrought steel butt-welding fittings 工厂制造的锻钢对焊管件
ASME B16.11	Forged fittings socket-welding and threaded 承插焊和螺纹连接的锻钢管件
ASME B16.5	Pipe flanges and flanged fittings 管法兰和法兰配件
MSS SP-43	Wrought stainless steel butt-welding fittings 锻制不锈钢对焊管件
MSS SP-75	Specification for high test forged butt-welding fittings 优质锻钢对焊管件标准
MSS SP-79	Socket-welding reducer inserts 承插焊渐缩式插接头
MSS SP-83	Class 3000 steel pipe unions socket-welding and Threaded 3000磅级的钢制承插焊和螺纹活接头
MSS SP-95	Swaged nipples and bull plugs 模锻螺纹管接头与大管塞
MSS SP-97	Integrally reinforced forged branch outlet fittings socket-welding, threaded and butt-welding ends 承插焊、螺纹和对焊端整体加强式管座
JIS B2311	Universal steel butt-welding pipe fittings 通用钢制对焊管件
JIS B2312	Steel butt-welding pipe fittings 钢制对焊管件
JIS B2313	Steel plate butt-welding pipe fittings 钢板制对焊管件
JIS B2316	Steel socket-welding pipe fittings 钢制承插焊管件
DIN 2605	Steel butt-welding pipe fittings, elbows and bends 钢制对焊管件、弯头和弯管
DIN 2615	Steel butt-welding pipe fittings, tees 钢制对焊管件、三通
DIN 2616	Steel butt-welding pipe fittings, reducers 钢制对焊管件、异径管
DIN 2617	Steel butt-welding pipe fittings, caps 钢制对焊管件、管帽



ASME for Pipes, Fittings and Flanges  
 美标钢管、管件、法兰（锻件）材料标准号对照表

Classification 钢种	Pipe 钢管	B.W Fittings 管件	Flanges 法兰
Carbon Steel 碳钢	A 106 Grade A	A 234 Grade WPB	A 105 Grade I
	A 106 Grade B	A 234 Grade WPB	A 105 Grade II
Alloy Steel 合金钢	A335 Grade P 1	A 234 Grade WP1	A 182 Grade F 1
	A335 Grade P 5	A 234 Grade WP5	A 182 Grade F 5
	A335 Grade P 7	A 234 Grade WP7	A 182 Grade F 7
	A335 Grade P 9	A 234 Grade WP9	A 182 Grade F 9
	A335 Grade P 11	A 234 Grade WP11	A 182 Grade F 11
	A335 Grade P 12	A 234 Grade WP12	A 182 Grade F 12
	A335 Grade P 22	A 234 Grade WP22	A 182 Grade F 22
Steel for Low-Temperature Service 低温用钢	A 333 Grade 1	A 420 Grade WPL 1	A 350 Grade LF 1
	A 333 Grade 3	A 420 Grade WPL 3	A 350 Grade LF 3
	A 333 Grade 4	A 420 Grade WPL 4	A 350 Grade LF 4
	A 333 Grade 6	A 420 Grade WPL 6	A 350 Grade LF 6
	A 333 Grade 8	A 420 Grade WPL 8	A 350 Grade LF 8
Stainless Steel 不锈钢	A 312 Grade TP 304	A 403 Grade WP 304	A 182 Grade F 304
	A 312 Grade TP 304H	A 403 Grade WP 304H	A 182 Grade F 304H
	A 312 Grade TP 304L	A 403 Grade WP 304L	A 182 Grade F 304L
	A 312 Grade TP 316	A 403 Grade WP 316	A 182 Grade F 316
	A 312 Grade TP 316H	A 403 Grade WP 316H	A 182 Grade F 316H
	A 312 Grade TP 316L	A 403 Grade WP 316L	A 182 Grade F 316L
	A 312 Grade TP 321	A 403 Grade WP 321	A 182 Grade F 321
	A 312 Grade TP 321H	A 403 Grade WP 321H	A 182 Grade F 321H
	A 312 Grade TP 347	A 403 Grade WP 347	A 182 Grade F 347
	A 312 Grade TP 347H	A 403 Grade WP 347H	A 182 Grade F 347H



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