



PIPE

FITTINGS

FLANGES

# Guide to Pipe and Fittings

Pipe Tolerances

Pipe Weights & Dimensions

Fitting Dimensions

Scope of Supply

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## ASTM A999/A999M-12

Standard Specification for Alloy and Stainless Pipe

### 16. Straightness

16.1 The finished pipe shall be reasonably straight.

16.2 For metal-arc welded pipe, the maximum deviation from a 10-ft [3.0-m] straight edge placed so that both ends are in contact with the pipe shall be 1/8 in. [3.2 mm]. For metal-arc welded pipe with lengths shorter than 10 ft. [3.0 m], this maximum deviation shall be prorated with respect to the ratio of the actual length to 10 ft. [3.0 m].

ASTM A999/A999M - 12				
Standard Specification for General Requirements for Alloy Stainless Steel Pipe				
Table 1-Permissible Variations in Outside Diameter				
NPS / DN Designator	Over (inches)	Over (mm)	Under (inches)	Under (mm)
1/8" to 1 1/2" incl (6mm to 40mm)	0.015	0.4	0.031	0.8
Over 1 1/2" to 4" incl (40mm to 100mm)	0.031	0.7	0.031	0.8
Over 4" to 8" incl (100mm to 200mm)	0.062	1.6	0.031	0.8
Over 8" to 18" incl (200mm to 450mm)	0.093	2.4	0.031	0.8
Over 18" to 26" incl (450mm to 650mm)	0.125	3.2	0.031	0.8
Over 26" to 34" incl (450mm to 850mm)	0.156	4.0	0.031	0.8
Over 34" to 48" incl (850mm to 1200mm)	0.187	4.8	0.031	0.8

**Minimum Wall thickness** on inspection for nominal (average) pipe wall thickness is covered under Appendix X1. of ASTM A999/A999m – 12

The following equation, may be applied to calculate minimum wall thickness from nominal (average) wall thickness:

$$tn \times 0.875 = tm$$

where:

**tn** = nominal (average) wall thickness,

and

**tm** = minimum wall thickness

**The nominal plain end mass**, in kilograms per meter, is calculated using the following formula:

$$Wpe = 0.0246615(D - t)t$$

where:

**D** = outside diameter to the nearest 0.1 mm for outside diameters that are 16 in. (406.4 mm) and smaller and to the nearest 1.0 mm for outside diameters larger than 16 in. (406.4mm) (the symbol D is to be used for OD only in mathematical equations or formulas)

and;

**Wpe** = nominal plain end mass, rounded to the nearest 0.01 kg/m

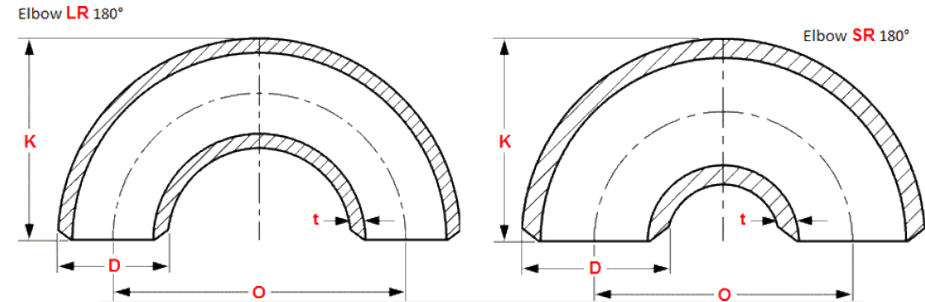
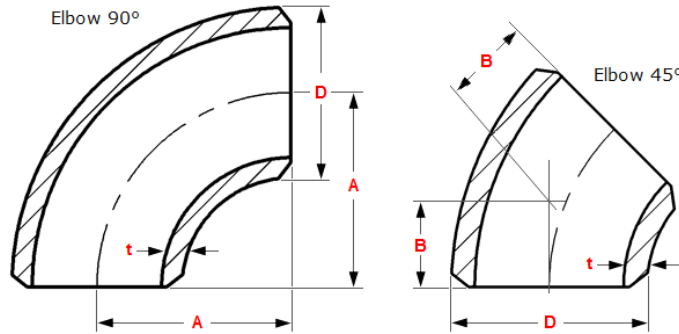
and;

**t** = specified wall thickness, rounded to the nearest 0.01 mm

Please note that the relevant standard must be checked for specific information in each situation. All contents of this document are a guide only.

Nominal Size		OD	Welded & Seamless Wrought Steel Pipe to ASME B36.10M (Weights are in kg/Lm)																
			Welded & Seamless Wrought Stainless Steel Pipe to ASME B36.19M (Weights are in kg/Lm)																
DN	NPS	mm	Schedule																
			5S	10S	10	20	30	40S	STD	40	60	80S	XS	80	100	120	140	160	XXS
6	1/8	10.3	-	0.28	0.28	-	0.32	0.37	0.37	0.37	-	0.47	0.47	0.47	-	-	-	-	-
8	1/4	13.7	-	0.49	0.49	-	0.54	0.63	0.63	0.63	-	0.80	0.80	0.80	-	-	-	-	-
10	3/8	17.1	-	0.63	0.63	-	0.70	0.84	0.84	0.84	-	1.10	1.10	1.10	-	-	-	-	-
15	1/2	21.3	0.80	1.00	1.00	-	1.12	1.27	1.27	1.27	-	1.62	1.62	1.62	-	-	-	1.95	2.55
20	3/4	26.7	1.02	1.28	1.28	-	1.44	1.69	1.69	1.69	-	2.20	2.20	2.20	-	-	-	2.90	3.64
25	1	33.4	1.29	2.09	2.09	-	2.18	2.50	2.50	2.50	-	3.24	3.24	3.24	-	-	-	4.24	5.45
32	1 1/4	42.2	1.65	2.69	2.69	-	2.87	3.39	3.39	3.39	-	4.47	4.47	4.47	-	-	-	5.61	7.77
40	1 1/2	48.3	1.90	3.11	3.11	-	3.54	4.05	4.05	4.05	-	5.41	5.41	5.41	-	-	-	7.25	9.55
50	2	60.3	2.39	3.93	3.93	-	4.48	5.44	5.44	5.44	-	7.48	7.48	7.48	-	-	-	11.11	13.44
65	2 1/2	73.0	3.69	5.26	5.26	-	8.04	8.63	8.63	8.63	-	11.41	11.41	11.41	-	-	-	14.92	20.39
80	3	88.9	4.52	6.46	6.46	-	9.92	11.29	11.29	11.29	-	15.27	15.27	15.27	-	-	-	21.35	27.68
90	3 1/2	101.6	5.18	7.41	7.41	-	11.41	13.57	13.57	13.57	-	18.64	18.64	18.64	-	-	-	-	-
100	4	114.3	5.84	8.37	8.37	-	12.91	16.08	16.08	16.08	-	22.32	22.32	22.32	-	28.32	-	33.54	41.03
125	5	141.3	9.46	11.56	11.56	-	-	21.77	21.77	21.77	-	30.97	30.97	30.97	-	40.28	-	49.12	57.43
150	6	168.3	11.31	13.83	13.83	-	-	28.26	28.26	28.26	-	42.56	42.56	42.56	-	54.21	-	67.57	79.22
200	8	219.1	14.78	19.97	19.97	33.32	36.81	42.55	42.55	42.55	53.09	64.64	64.64	64.64	75.92	90.44	100.93	111.27	107.93
250	10	273.1	22.61	27.79	27.79	41.77	51.03	60.31	60.31	60.31	81.56	81.56	81.56	96.02	114.76	133.06	155.16	172.34	155.16
300	12	323.9	31.25	35.99	35.99	49.73	65.20	73.88	73.88	79.73	108.96	97.47	97.47	132.09	159.92	186.98	208.15	238.78	186.98
350	14	355.6	34.34	41.36	54.69	67.91	81.33	81.33	81.33	94.55	126.72	107.4	107.4	158.11	194.98	224.66	253.58	281.72	-
400	16	406.4	41.56	47.34	62.65	77.83	93.27	93.27	93.27	123.31	160.13	123.31	123.31	203.54	245.57	286.66	333.21	365.38	-
450	18	457	46.79	53.31	70.57	87.71	122.38	105.17	105.17	155.81	205.75	139.16	139.16	254.57	309.64	363.58	408.28	459.39	-
500	20	508	59.32	68.65	78.56	117.15	155.12	117.15	117.15	183.43	247.84	155.13	155.13	311.19	381.55	441.52	508.15	564.85	-
550	22	559	65.33	75.62	86.55	129.14	171.09	-	129.14	-	294.27	-	171.10	373.85	451.45	527.05	600.67	672.30	-
600	24	610	82.58	94.53	94.53	141.12	209.64	141.12	141.12	255.43	355.28	187.07	187.07	442.11	547.74	640.07	720.19	808.27	-
650	26	660	-	-	127.36	202.74	-	-	152.88	-	-	-	202.74	-	-	-	-	-	-
700	28	711	-	-	137.32	218.71	271.21	-	164.86	-	-	-	218.71	-	-	-	-	-	-
750	30	762	118.34	147.29	147.29	234.68	292.18	-	176.85	-	-	-	234.68	-	-	-	-	-	-
800	32	813	-	-	157.25	250.65	312.15	-	188.83	342.94	-	-	250.65	-	-	-	-	-	-
850	34	864	-	-	167.21	266.63	332.12	-	200.82	364.92	-	-	266.63	-	-	-	-	-	-
900	36	914	-	-	176.97	282.29	351.70	-	212.57	420.45	-	-	282.29	-	-	-	-	-	-

Nominal Size		OD	Nominal Wall Thickness For Welded & Seamless Wrought Steel Pipe To ASME B36.10 (In Millimeters)																
			Nominal Wall Thickness For Welded & Seamless Wrought Stainless Steel Pipe To ASME B36.19 (In Millimeters)																
DN	NPS	mm	Schedule																
			5S	10S	10	20	30	40S	STD	40	60	80S	XS	80	100	120	140	160	XXS
6	1/8	10.3	-	1.24	1.24	-	1.45	1.73	1.73	1.73	-	2.41	2.41	2.41	-	-	-	-	-
8	1/4	13.7	-	1.65	1.65	-	1.85	2.24	2.24	2.24	-	3.02	3.02	3.02	-	-	-	-	-
10	3/8	17.1	-	1.65	1.65	-	1.85	2.31	2.31	2.31	-	3.20	3.20	3.20	-	-	-	-	-
15	1/2	21.3	1.65	2.11	2.11	-	2.41	2.77	2.77	2.77	-	3.73	3.73	3.73	-	-	-	4.78	7.47
20	3/4	26.7	1.65	2.11	2.11	-	2.41	2.87	2.87	2.87	-	3.91	3.91	3.91	-	-	-	5.56	7.82
25	1	33.4	1.65	2.77	2.77	-	2.90	3.38	3.38	3.38	-	4.55	4.55	4.55	-	-	-	6.35	9.09
32	1 1/4	42.2	1.65	2.77	2.77	-	2.97	3.56	3.56	3.56	-	4.85	4.85	4.85	-	-	-	6.35	9.70
40	1 1/2	48.3	1.65	2.77	2.77	-	3.18	3.68	3.68	3.68	-	5.08	5.08	5.08	-	-	-	7.14	10.15
50	2	60.3	1.65	2.77	2.77	-	3.18	3.91	3.91	3.91	-	5.54	5.54	5.54	-	-	-	8.74	11.07
65	2 1/2	73.0	2.11	3.05	3.05	-	4.78	5.16	5.16	5.16	-	7.01	7.01	7.01	-	-	-	9.53	14.02
80	3	88.9	2.11	3.05	3.05	-	4.78	5.49	5.49	5.49	-	7.62	7.62	7.62	-	-	-	11.13	15.24
90	3 1/2	101.6	2.11	3.05	3.05	-	4.78	5.74	5.74	5.74	-	8.08	8.08	8.08	-	-	-	-	-
100	4	114.3	2.11	3.05	3.05	-	4.78	6.02	6.02	6.02	-	8.56	8.56	8.56	-	11.13	-	13.49	17.12
125	5	141.3	2.77	3.40	3.40	-	-	6.55	6.55	6.55	-	9.53	9.53	9.53	-	12.70	-	15.88	19.05
150	6	168.3	2.77	3.40	3.40	-	-	7.11	7.11	7.11	-	10.97	10.97	10.97	-	14.27	-	18.26	21.95
200	8	219.1	2.77	3.76	3.76	6.35	7.04	8.18	8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.23
250	10	273.1	3.40	4.19	4.19	6.35	7.80	9.27	9.27	9.27	12.70	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40
300	12	323.9	3.96	4.57	4.57	6.35	8.38	9.53	9.53	10.31	14.27	12.70	12.70	17.48	21.44	25.40	28.58	33.32	25.40
350	14	355.6	3.96	4.78	6.35	7.92	9.53	9.53	9.53	11.13	15.09	12.70	12.70	19.05	23.83	27.79	31.75	35.71	-
400	16	406.4	4.19	4.78	6.35	7.92	9.53	9.53	9.53	12.70	16.66	12.70	12.70	21.44	26.19	30.96	36.53	40.49	-
450	18	457	4.19	4.78	6.35	7.92	11.13	9.53	9.53	14.27	19.05	12.70	12.70	23.83	29.36	34.93	39.67	45.24	-
500	20	508	4.78	5.54	6.35	9.53	12.70	9.53	9.53	15.09	20.62	12.70	12.70	26.19	32.54	38.10	44.45	50.01	-
550	22	559	4.78	5.54	6.35	9.53	12.70	-	9.53	-	22.23	-	12.70	28.58	34.93	41.28	47.63	53.98	-
600	24	610	5.54	6.35	6.35	9.53	14.27	9.53	9.53	17.48	24.61	12.70	12.70	30.96	38.89	46.02	52.37	59.54	-
650	26	660	-	-	7.92	12.70	-	-	9.53	-	-	-	12.70	-	-	-	-	-	-
700	28	711	-	-	7.92	12.70	15.88	-	9.53	-	-	-	12.70	-	-	-	-	-	-
750	30	762	6.35	7.92	7.92	12.70	15.88	-	9.53	-	-	-	12.70	-	-	-	-	-	-
800	32	813	-	-	7.92	12.70	15.88	-	9.53	17.48	-	-	12.70	-	-	-	-	-	-
850	34	864	-	-	7.92	12.70	15.88	-	9.53	17.48	-	-	12.70	-	-	-	-	-	-
900	36	914	-	-	7.92	12.70	15.88	-	9.53	19.05	-	-	12.70	-	-	-	-	-	-



Long and Short Radius Elbows

Nominal Pipe Size mm	Outside Diameter at Bevel D	Centre to End		
		Long Radius Elbow		Short Radius Elbow
		90 Deg A	45 Deg B	90 Deg A
15	21.3	38.1	15.7	—
20	26.7	28.4	11.2	—
25	33.5	38.1	22.4	25.4
32	42.2	47.8	25.4	31.8
40	48.3	57.2	28.4	38.1
50	60.3	76.2	35.1	50.8
65	73.0	95.2	44.4	63.5
80	88.9	114.3	50.8	76.2
100	114.3	152.4	63.5	101.6
125	141.3	190.5	79.2	127.0
150	168.3	228.6	95.2	152.4
200	219.1	304.8	127.0	203.2
250	273.1	381.0	158.8	254.0
300	323.8	457.2	190.5	304.8
350	355.6	533.4	222.2	355.6
400	406.4	609.6	254.0	406.4
450	457.2	685.8	285.8	457.2
500	508.0	762.0	317.5	508.0
600	609.6	914.4	381.0	609.6

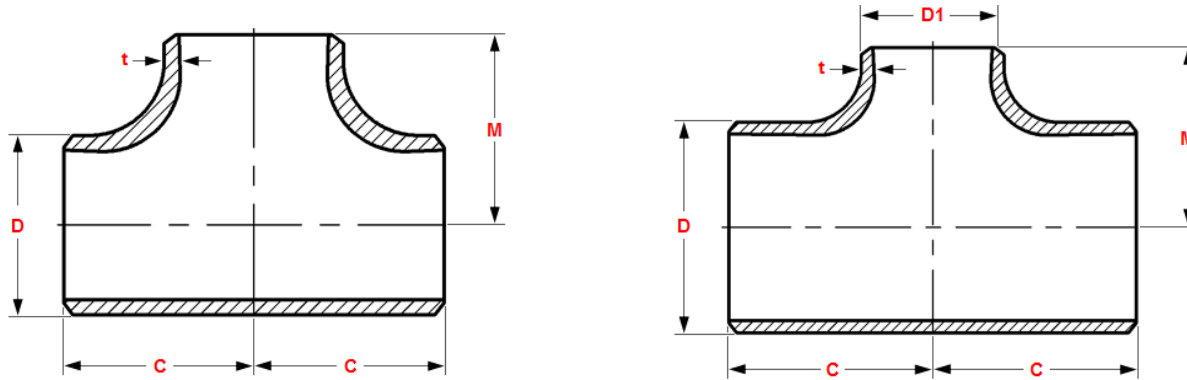
Note: "t" = wall thickness and is designated by linepipe schedule

Return (180deg) Elbows

Nominal Pipe Size mm	Outside Diameter at Bevel D	Long Radius		Short Radius	
		Centre to Centre O	Back to Face K	Centre to Centre O	Back to Face K
15	21.3	76.2	47.8	—	—
20	26.7	57.2	42.9	—	—
25	33.5	76.2	55.6	50.8	41.1
32	42.2	95.2	69.8	63.5	52.3
40	48.3	114.3	82.6	76.2	62.0
50	60.3	152.4	106.4	101.6	81.0
65	73.0	190.5	131.8	127.0	100.1
80	88.9	228.6	158.8	152.4	120.7
100	114.3	304.8	209.6	203.2	158.8
125	141.3	381.0	261.9	254.0	196.9
150	168.3	457.2	312.7	304.8	236.5
200	219.1	609.6	414.3	406.4	312.7
250	273.1	762.0	517.7	508.0	390.7
300	323.8	914.4	619.3	609.6	466.9
350	355.6	1066.8	711.2	711.2	533.4
400	406.4	1219.2	812.8	812.8	609.6
450	457.2	1371.6	914.4	914.4	685.8
500	508.0	1524.0	1016.0	1016.0	762.0
600	609.6	1828.8	1219.2	1219.2	914.4

Note: "t" = wall thickness and is designated by linepipe schedule





**Tees: Equal and Reducing**

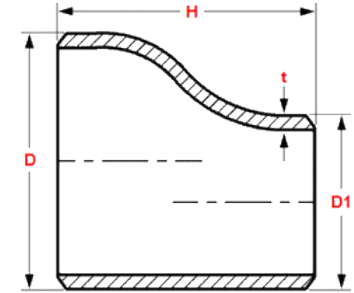
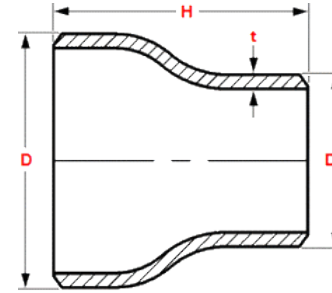
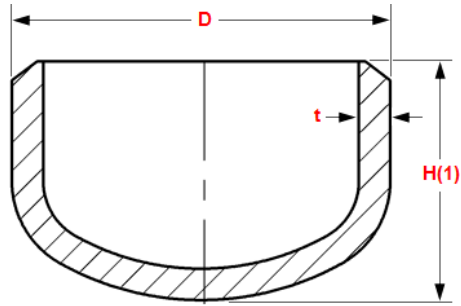
Nominal Pipe Size mm	Outside Diameter at Bevel D		Centre-to-end		Nominal Pipe Size mm	Outside Diameter at Bevel D		Centre-to-end	
	Run	Outlet	Run C	Outlet M		Run	Outlet	Run C	Outlet M
15x15	21.3	21.3	25.4	25.4	80x80		88.9		85.9
20x20	26.7	26.7	28.4	28.4	80x65	88.9	73.0	85.9	82.6
20x15		21.3		28.4	76.2				
25x25	33.5	33.5	38.1	38.1	80x40		48.3		73.0
25x20		26.7		38.1	69.8				
25x15		21.3		38.1					
32x32	42.2	42.2	47.8	47.8	100x100	114.3	114.3	104.6	104.6
32x25		33.5		47.8	98.6				
32x20		26.7		47.8	114.3	73.0	104.6	95.2	
32x15		21.3		47.8	100x80	88.9	104.6	88.9	88.9
					100x65	73.0	104.6	88.9	88.9
40x40	48.3	48.3	57.2	57.2	125x125	141.3	141.3	124.0	124.0
40x32		42.2		57.2	117.3				
40x25		33.5		57.2	111.3				
40x20		26.7		57.2	108.0				
		21.3		57.2	104.6				
50x50		60.3		60.3	63.5	63.5	150x150	168.3	168.3
50x40	48.3		63.5	136.7					
50x32	42.2		63.5	130.0					
50x25	33.5		63.5	124.0					
	26.7		63.5	120.6					
65x65	73.0		73.0	76.2		76.2	200x200	219.1	219.1
65x50		60.3	76.2		168.3				
65x40		48.3	76.2		162.1				
65x32		42.2	76.2		155.4				
		33.5	76.2						
65x25			76.2						

Note: "t" = wall thickness and is designated by linepipe schedule

**Tees: Equal and Reducing**

Nominal Pipe Size mm	Outside Diameter at Bevel D		Centre-to-end		Nominal Pipe Size mm	Outside Diameter at Bevel D		Centre-to-end	
	Run	Outlet	Run C	Outlet M		Run	Outlet	Run C	Outlet M
250x250	273.1	273.1	215.9	215.9	450x450	457.2	457.2	342.9	342.9
250x200		219.1		203.2	330.2				
250x150		168.3		193.5	330.2				
250x125		141.3		190.5	320.5				
250x100		114.3		184.2	307.8				
			298.4						
300x300	323.8	323.8	254.0	254.0	500x500	508.0	508.0	381.0	381.0
300x250		273.1		241.3	368.3				
300x200		219.1		228.6	355.6				
300x150		168.3		219.1	355.6				
300x125	141.3	215.9	323.8						
			323.8						
350x350	355.6	355.6	279.4	279.4	500x300	508.0	508.0	381.0	381.0
350x300		323.8		269.7	345.9				
350x250		273.1		257.0	333.2				
350x200		219.1		247.6	323.8				
350x150		168.3		238.3					
400x400	406.4	406.4	304.8	304.8	600x600		609.6		609.6
400x350		355.6		304.8	431.8				
400x300		323.8		295.1	419.1				
400x250		273.1		282.4	406.4				
400x200		219.1		373.0	406.4				
400x150		168.3		263.7	396.7				
					384.0				

Note: "t" = wall thickness and is designated by linepipe schedule



### Reducers Concentric and Eccentric

Caps			
Nominal Pipe Size mm	Outside Diameter at Bevel D	Length* H (1)	Limiting Wall Thickness for Length H (1)
15	21.3	25.4	4.6
20	26.7	25.4	3.8
25	33.5	38.1	4.6
32	42.2	38.1	4.8
40	48.3	38.1	5.1
50	60.3	38.1	5.6
65	73.0	38.1	7.1
80	88.9	50.8	7.6
100	114.3	63.5	8.6
125	141.3	76.2	9.7
150	168.3	88.9	10.9
200	219.1	101.6	12.7
250	273.1	127.0	12.7
300	323.8	152.4	12.7
350	355.6	165.1	12.7
400	406.4	177.8	12.7
450	457.2	203.2	12.7
500	508.0	228.6	12.7
600	609.6	266.7	12.7

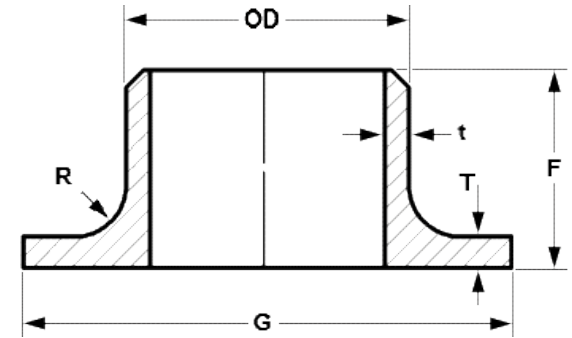
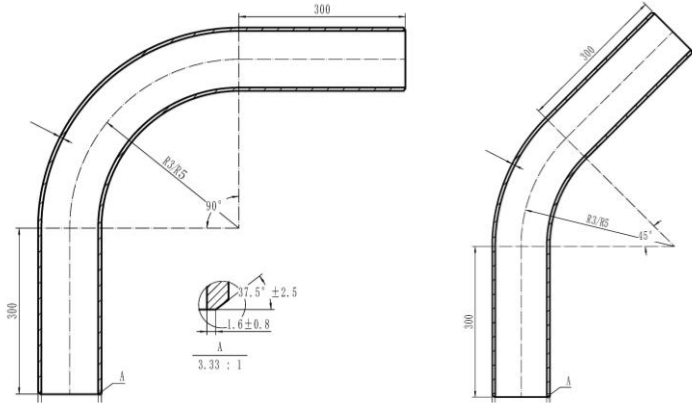
Note: "t" = wall thickness and is designated by linepipe schedule

\* Length applies for thickness not exceeding that given in column

NB Pipe Size	Outside Diameter at Bevel		End to End H	NB Pipe Size	Outside Diameter at Bevel		End to End H	NB Pipe Size	Outside Diameter at Bevel		End to End H
	Large End D	Small End D1			Large End D	Small End D1			Large End D	Small End D1	
20x15	26.7	21.3	38.1	100x80		88.9		350x300		323.8	
25x20				100x65	114.3	73.0	101.6	350x250	355.6	273.1	330.2
25x15	33.5	21.3	50.8	100x50		60.3		350x200		219.1	
				100x40		48.3		350x150		168.3	
32x25				125x100		114.3		400x350		355.6	
32x20	42.2	26.7	50.8	125x80	141.3	88.9	127	400x300	406.4	323.8	355.6
32x15		21.3		125x65		73.0		400x250		273.1	
				125x50		60.3		400x200		219.1	
40x32		42.2		150x125		141.3		450x400		406.4	
40x25		33.5		150x100		114.3		450x350		355.6	
40x20	48.3	26.7	63.5	150x80	168.3	88.9	139.7	450x300	457.2	323.8	381
40x15		21.3		150x65		73.0		450x250		273.1	
50x40		48.3		200x150		168.3		500x450		457.2	
50x32		42.2		200x125		141.3		500x400	508	406.4	508
50x25	60.3	33.5	76.2	200x100	219.1	114.3	152.4	500x350		355.6	
50x20		26.7		200x80		88.9		500x300	508	323.8	
65x50		60.3		250x200		219.1		600x500		508.0	
65x40		48.3		250x150	273.1	168.3	177.8	600x450	609.6	457.2	508
65x32	73	42.2	88.9	250x125		141.3		600x400		406.4	
65x25		33.5		250x100		114.3					
80x65		73.0		300x250		273.1					
80x50		60.3		300x200	323.8	219.1	203.2				
80x40	88.9	48.3	88.9	300x150		168.3					
80x32		42.2		300x125		141.3					

Note: "t" = wall thickness and is designated by linepipe schedule





Induction 3D & 5D Bend						
Nominal Pipe Size	Outside Diameter at Bevel	3D Centre Line Radius		5D Centre Line Radius		Tangent *
		90 Deg R3 *	45 Deg R3 *	90 Deg R5 *	45 Deg R5 *	
15	21.3	38.1	38.1	63.5	63.5	300
20	26.7	57.2	57.2	95.3	95.3	300
25	33.5	76.2	76.2	127.0	127.0	300
32	42.2	95.3	95.3	158.8	158.8	300
40	48.3	114.3	114.3	190.5	190.5	300
50	60.3	152.4	152.4	254.0	254.0	300
65	73.0	190.5	190.5	317.5	317.5	300
80	88.9	228.6	228.6	381.0	381.0	300
100	114.3	304.8	304.8	508.0	508.0	300
125	141.3	381.0	381.0	635.0	635.0	300
150	168.3	457.2	457.2	762.0	762.0	300
200	219.1	609.6	609.6	1,016	1,016	300
250	273.1	762.0	762.0	1,270	1,270	300
300	323.8	914.4	914.4	1,524	1,524	300
350	355.6	1,067	1,067	1,778	1,778	300
400	406.4	1,219	1,219	2,032	2,032	300
450	457.2	1,372	1,372	2,286	2,286	300
500	508.0	1,524	1,524	2,540	2,540	300
600	609.6	1,829	1,829	3,048	3,048	300

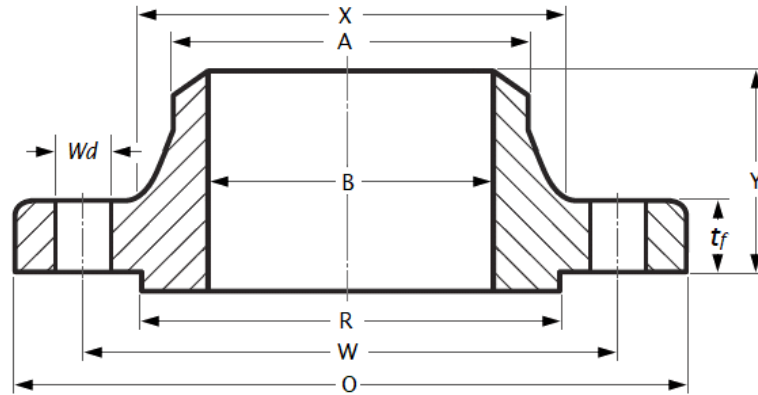
Stub Ends Type A Radius for Lap Joint Type B Square for Slip On				ASME & MSS Type A	MSS Type B	ASME B16.9 Radius Type				MSS SP43 Type A & B	
NB	OD max	OD min	G			R	R max	Long Pattern		Short Pattern	
				F	Approx kg			F	Approx kg		
15	22.8	20.5	35	3	0.76	76	0.12	51	0.07	51	0.07
20	28.1	25.9	43	3	0.76	76	0.16	51	0.10	51	0.10
25	35.0	32.6	51	3	0.76	102	0.31	51	0.16	51	0.16
32	43.6	41.4	64	5	0.76	102	0.44	51	0.22	51	0.22
40	49.9	47.5	73	6	0.76	102	0.54	51	0.25	51	0.25
50	62.4	59.5	92	8	0.76	152	1.02	64	0.43	64	0.43
65	75.3	72.2	105	8	0.76	152	1.54	64	0.57	64	0.57
80	91.3	88.1	127	10	0.76	152	2.11	64	0.73	64	0.73
90	104.0	100.8	140	10	0.76	152	2.67	76	0.86	76	0.86
100	116.7	113.5	157	11	0.76	152	3.10	76	1.09	76	1.09
125	114.3	140.5	186	11	1.52	203	5.39	76	1.47	76	1.47
150	171.3	167.5	216	13	1.52	203	6.89	89	2.15	89	2.15
200	222.1	218.3	270	13	1.52	203	10.80	102	3.22	102	3.22
250	277.2	272.3	324	13	1.52	254	17.92	127	5.13	127	5.13
300	328.0	323.1	381	13	1.52	254	22.00	152	8.16	152	8.16
350	359.9	354.8	413	13	1.52	305	28.58	152	10.89	152	10.89
400	411.0	405.6	470	13	1.52	305	33.34	152	12.70	152	12.70
450	462.0	456.0	533	13	1.52	305	44.91	152	17.24	152	17.24
500	514.0	507.0	584	13	1.52	305	48.99	152	21.77	152	21.77
550	565.0	558.0	641	13	1.52	305	56.02	152	24.50	152	24.50
600	616.0	609.0	692	13	1.52	305	63.05	152	27.22	152	27.22

Note: wall thickness is designated by nominal pipe wall thickness.  
\* SPFA standard dimensions; according to ASME B16.49 the BEND RADIUS (R3 & R5) and TANGENT are specified by the purchaser.

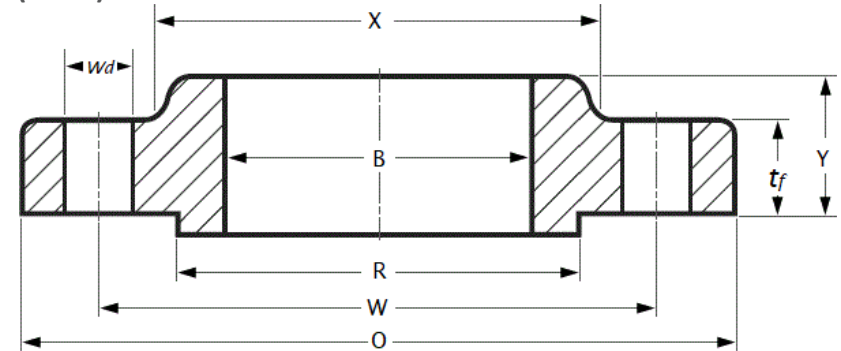
Note: the lap thickness "T" shall not be less than nominal pipe wall thickness "t"

## Dimensional arrangements for ASME B16.5 Flanges

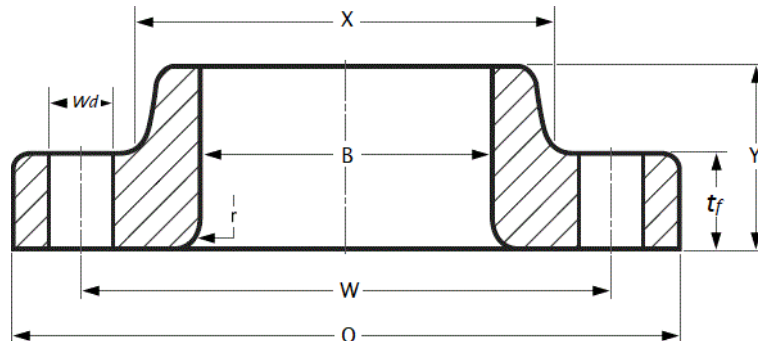
**WELD NECK (WNRF)**



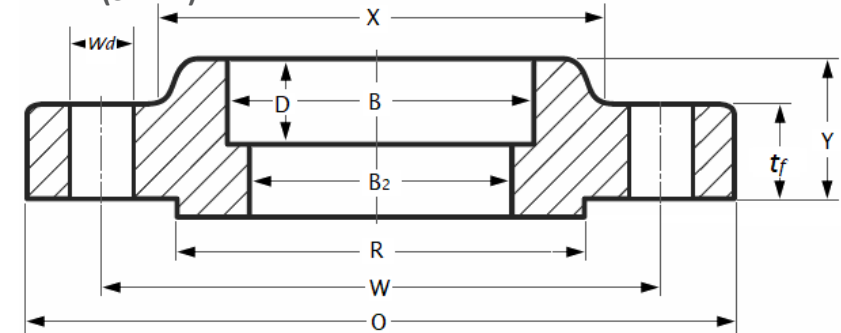
**SLIP ON (SORF)**



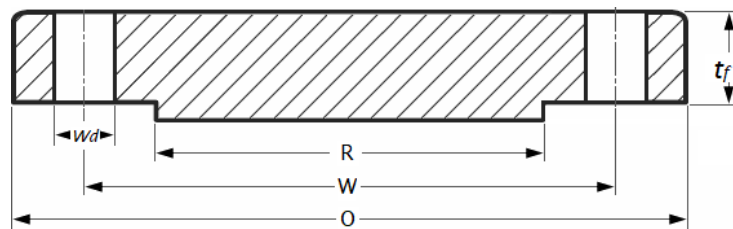
**LAP JOINT (LJFF)**



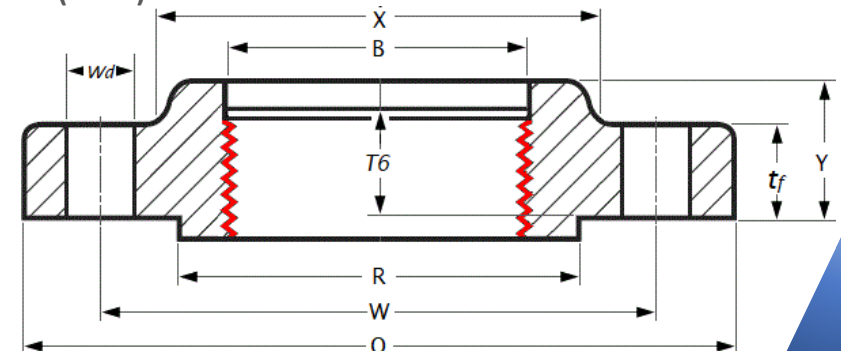
**SOCKET WELD (SWRF)**



**BLIND (BLRF)**



**THREADED (THRF)**



## Dimensional tables for ASME B16.5 Flanges

CLASS 150		15	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600
OD	O	90	100	110	120	130	150	180	190	215	230	255	280	345	405	485	535	595	635	700	815
MIN THICK *	$t_f$	11.2	12.7	14.3	15.9	17.5	19.1	22.3	23.9	23.9	23.9	23.9	25.4	28.6	30.2	31.8	35.0	36.6	39.7	42.9	47.7
HUB LENGTH **	Y	16	16	17	21	22	25	29	30	32	33	36	40	44	49	56	57	64	68	73	83
HUB LENGTH W/N	Y	48	52	56	57	62	64	70	70	71	76	89	89	102	102	114	127	127	140	145	152
PCD	W	60.3	69.9	79.4	88.9	98.4	120.7	139.7	152.4	177.8	190.5	215.9	241.3	298.5	362.0	431.8	476.3	539.8	577.9	635.0	749.3
BOLT HOLE DIA	$wd$	16	16	16	16	16	19	19	19	19	19	22	22	22	25	25	29	29	32	32	35
No. BOLTS	$n$	4	4	4	4	4	4	4	4	4	8	8	8	8	12	12	12	16	16	20	20
WEIGHT ***	kg	0.5	0.7	0.9	1.1	1.4	2.2	3.2	3.6	5.0	5.9	6.8	8.0	12.8	18.0	27.7	37.7	48.2	59.0	67.0	96.0
WEIGHT W/N	kg	0.9	0.9	1.4	1.4	1.8	2.8	4.6	5.2	5.5	7.8	9.6	12.5	19.9	24.6	40.0	52.0	65.0	76.0	89.4	123.0
WEIGHT BLIND	kg	0.9	0.9	0.9	1.4	1.8	2.3	3.2	5.5	5.9	7.7	9.1	12.0	21.4	30.5	50.0	63.0	85.0	99.0	129.0	190.0
CLASS 300		15	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600
OD	O	95	115	125	135	155	165	190	210	230	255	280	320	380	445	520	585	650	710	775	915
MIN THICK *	$t_f$	12.7	14.3	15.9	19.1	20.7	22.3	25.4	28.6	30.2	31.8	35.0	36.6	41.3	47.7	50.8	54.0	57.2	60.4	63.5	69.9
HUB LENGTH **	Y	22	25	25	27	30	33	38	43	44	48	51	52	62	67	73	76	83	89	95	106
HUB LENGTH W/N	Y	52	57	60	65	68	70	76	79	81	86	98	98	111	117	130	143	146	159	162	168
PCD	W	66.7	82.6	88.9	98.4	114.3	127.0	149.2	168.3	184.2	200.0	235.0	269.9	330.2	387.4	450.8	514.4	571.5	628.6	685.8	812.8
BOLT HOLE DIA	$wd$	16	19	19	19	22	19	22	22	22	22	22	22	25	29	32	32	35	35	35	41
No. BOLTS	$n$	4	4	4	4	4	8	8	8	4	8	8	12	12	16	16	20	20	24	24	24
WEIGHT ***	kg	0.7	1.1	1.4	2.1	3.0	3.2	4.6	5.9	7.3	10.5	13.2	16.3	25.0	35.0	51.0	72.0	95.0	115.0	140.0	223.0
WEIGHT W/N	kg	0.9	1.4	1.8	2.3	3.2	3.6	5.5	6.9	9.1	12.1	16.4	21.1	31.4	44.0	65.0	94.0	113.0	139.0	168.0	236.0
WEIGHT BLIND	kg	0.9	1.4	1.8	2.7	3.2	3.6	5.5	7.3	9.6	12.7	16.8	21.8	35.9	55.0	83.0	110.0	143.0	188.0	234.0	364.0
CLASS 600		15	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600
OD	O	95	115	125	135	155	165	190	210	230	275	330	355	420	510	560	605	685	745	815	940
MIN THICK *	$t_f$	14.3	15.9	17.5	20.7	22.3	25.4	28.6	31.8	35.0	38.1	44.5	47.7	55.6	63.5	66.7	69.9	76.2	82.6	88.9	101.6
HUB LENGTH **	Y	22	25	27	29	32	37	41	46	49	54	60	67	76	86	92	94	106	117	127	140
HUB LENGTH W/N	Y	52	57	62	67	70	73	79	83	86	102	114	117	133	152	156	165	178	184	190	203
PCD	W	66.7	82.6	88.9	98.4	114.3	127.0	149.2	168.3	184.2	215.9	266.7	292.1	349.2	431.8	489.0	527.0	603.2	654.0	723.9	838.2
BOLT HOLE DIA	$wd$	16	19	19	19	22	20	22	22	25	25	29	29	32	35	35	38	41	45	45	51
No. BOLTS	$n$	4	4	4	4	4	8	8	8	8	8	12	12	12	16	20	20	20	20	24	24
WEIGHT ***	kg	0.9	1.4	1.6	2.1	3.2	3.6	5.5	6.8	9.6	15.0	28.6	36.4	44.1	80.0	98.0	118.0	166.0	216.0	278.0	398.0
WEIGHT W/N	kg	1.4	1.6	1.8	2.5	3.6	4.6	6.4	8.2	11.8	16.8	30.9	33.2	51.0	86.0	103.0	125.0	200.0	252.0	314.0	444.0
WEIGHT BLIND	kg	0.9	1.4	1.8	2.7	3.6	4.6	6.8	9.1	13.2	18.6	30.9	39.1	63.0	105.0	134.0	172.0	240.0	302.0	389.0	534.0

Note: \* Min thickness includes raised face but not hub or WN  
 \*\* Hub length for slip on and threaded flanges  
 \*\*\* Approximate weight SW, SO, LJ & THD (excludes WN) - ALL weights are approximate only

## Dimensional tables for ASME B16.5 Flanges

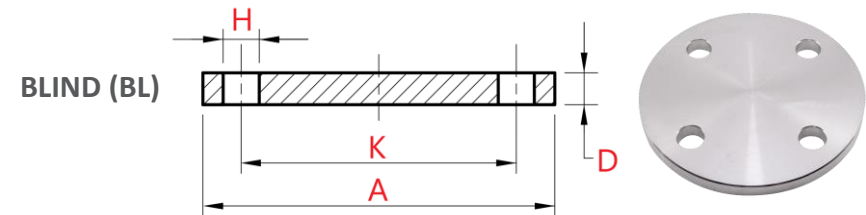
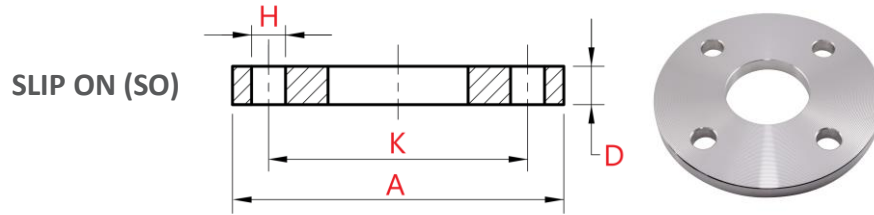
CLASS 900		15	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600	
OD	O	Use CLASS 1500 Dimensions								240		290	350	380	470	545	610	640	705	785	855	1040
MIN THICK *	$t_f$									38.5		44.5	51.0	56.0	63.5	70.0	79.5	86.0	89.0	102.0	108.0	140.0
HUB LENGTH **	Y									54	Size is	70	79	86	102	108	117	130	133	152	159	203
HUB LENGTH W/N	Y									102	not	114	127	140	162	184	200	213	216	229	248	292
PCD	W									190.5	defined	235.0	279.4	317.5	393.7	469.9	533.4	558.8	616.0	685.8	749.3	901.7
BOLT HOLE DIA	$W_d$									25	by	32	35	32	38	38	38	41	45	51	54	66
No. BOLTS	$n$									8	ASME	8	8	12	12	16	20	20	20	20	20	20
WEIGHT ***	kg									14.1	B16.5	24.1	37.7	49.0	78.1	111.2	148.0	172.5	208.4	293.7	359.6	671.9
WEIGHT W/N	kg									13.2		23.2	39.0	49.9	84.9	121.7	168.9	255.2	311.0	419.5	528.5	956.6
WEIGHT BLIND	kg									14.0		24.6	39.6	51.0	90.0	132.0	188.0	225.0	281.0	400.0	503.0	954.0
CLASS 1500		15	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600	
OD	O	120	130	150	160	180	215	245	265		310	375	395	485	585	675	750	825	915	985	1170	
MIN THICK *	$t_f$	22.5	25.5	29.0	29.0	32.0	38.5	41.5	48.0		54.0	73.5	83.0	92.0	108.0	124.0	133.5	146.5	162.0	178.0	203.5	
HUB LENGTH **	Y	32	35	41	41	44	57	64	-	Size is	-	-	-	-	-	-	-	-	-	-	-	
HUB LENGTH W/N	Y	60	70	73	73	83	102	105	117	not	124	156	171	213	254	283	298	311	327	356	406	
PCD	W	82.6	88.9	101.6	111.1	123.8	165.1	190.5	203.2	defined	241.3	292.1	317.5	393.7	482.6	571.5	635.0	704.8	774.7	831.8	990.6	
BOLT HOLE DIA	$W_d$	22	22	25	25	29	25	29	35	by	35	41	38	45	51	55	58	67	73	80	92	
No. BOLTS	$n$	4	4	4	4	4	8	8	8	ASME	8	8	12	12	12	16	16	16	16	16	16	
WEIGHT ***	kg	2.7	2.7	3.8	4.6	6.4	10.0	16.4	-	B16.5	-	-	-	-	-	-	-	-	-	-	-	
WEIGHT W/N	kg	2.3	3.2	3.9	4.6	6.4	10.9	16.4	21.8		31.4	60.0	75.0	124.0	206.0	314.0	380.0	775.0	644.0	775.0	1232	
WEIGHT BLIND	kg	1.8	2.7	4.1	4.6	6.4	11.4	15.9	21.8		33.2	65.0	72.0	137.0	230.0	352.0	420.0	558.0	760.0	965.0	1558	

Note: \* Min thickness includes raised face but not hub or WN

\*\* Hub length for slip on and threaded flanges

\*\*\* Approximate weight SW, SO, LJ & THD (excludes WN) - ALL weights are approximate only

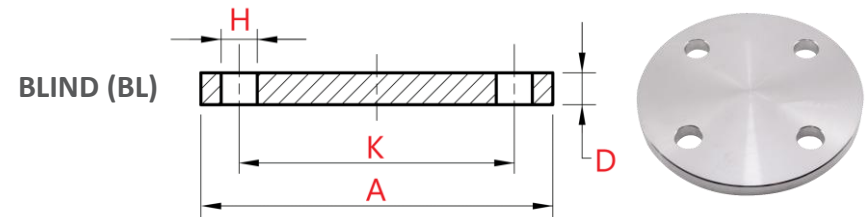
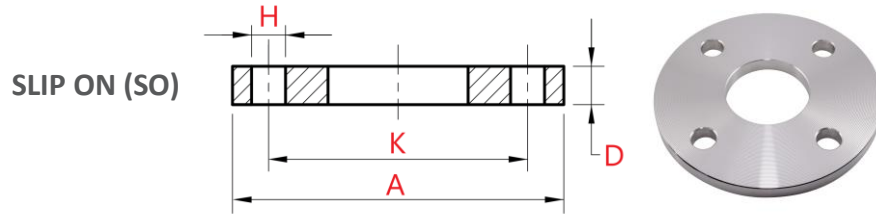




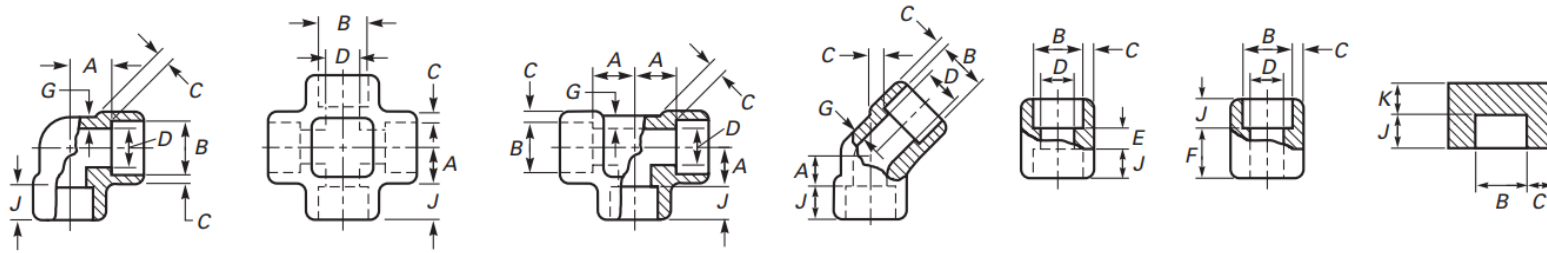
AS2129 TABLE D	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS * D	5	5	5	6	6	8	8	10	10	13	13	13	16	19	22	22	25	29	32
O D A	95	100	115	120	135	150	165	185	215	255	280	335	405	455	525	580	640	705	825
PCD K	67	73	83	87	98	114	127	146	178	210	235	292	356	406	470	521	584	641	756
No BOLTS n	4	4	4	4	4	4	4	4	4	8	8	8	8	12	12	12	12	16	16
BOLT SIZE H	M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M16	M16	M20	M20	M24	M24	M24	M24	M27
I WEIGHT SO kg	0.30	0.30	0.40	0.50	0.60	0.90	1.10	1.60	2.10	3.70	4.10	5.10	8.80	11.90	20.20	23.10	30.70	42.40	60.20
WEIGHT BL kg	0.28	0.31	0.41	0.54	0.68	1.12	1.36	2.14	2.89	5.28	6.36	9.11	16.39	24.56	37.86	46.21	63.94	90.00	136.00
AS2129 TABLE E	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS * D	6	6	7	8	9	10	10	11	13	14	17	19	22	25	29	32	35	38	48
O D A	95	100	115	120	135	150	165	185	215	255	280	335	405	455	525	580	640	705	825
PCD K	67	73	83	87	98	114	127	146	178	210	235	292	356	406	470	521	584	641	756
No BOLTS n	4	4	4	4	4	4	4	4	8	8	8	8	12	12	12	12	16	16	16
BOLT SIZE H	M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M20	M20	M20	M24	M24	M24	M24	M24	M30
WEIGHT SO kg	0.30	0.40	0.50	0.60	0.90	1.20	1.30	1.80	2.70	3.90	5.30	7.50	12.10	15.60	26.60	33.6	42.90	55.50	90.30
WEIGHT BL kg	0.34	0.37	0.58	0.72	1.02	1.40	1.70	2.35	3.75	5.68	8.32	13.31	22.53	32.32	49.91	67.22	89.50	117.93	204.00
AS2129 TABLE F	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS * D	10	10	10	13	13	16	16	16	19	22	22	25	29	32	35	41	44	51	57
O D A	95	100	120	135	140	165	185	205	230	280	305	370	430	490	550	610	675	735	850
PCD K	67	73	87	98	105	127	146	165	191	235	260	324	381	438	495	552	610	673	871
No BOLTS n	4	4	4	4	4	4	8	8	8	8	12	12	16	16	20	20	24	24	24
BOLT SIZE H	M12	M12	M16	M16	M16	M16	M16	M16	M16	M20	M20	M20	M24	M24	M27	M27	M30	M30	M33
WEIGHT SO kg	0.50	0.54	0.77	1.26	1.32	2.27	2.68	3.21	4.49	7.61	8.21	13.17	18.72	25.15	35.76	48.87	62.33	82.15	114.19
WEIGHT BL kg	0.53	0.59	0.84	1.41	1.53	2.66	3.25	4.05	6.14	10.53	12.32	21.05	32.93	47.12	64.76	93.24	122.59	168.38	253.10
AS2129 TABLE H	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS D	13	13	14	17	17	19	19	22	25	29	29	32	35	41	48	54	60	67	76
O D A	115	115	120	135	140	165	185	205	230	280	305	370	430	490	550	610	675	735	850
PCD K	83	83	87	98	105	127	146	165	191	235	260	324	381	438	495	552	610	673	871
No BOLTS n	4	4	4	4	4	4	8	8	8	8	12	12	16	16	20	20	24	24	24
BOLT SIZE H	M16	M16	M16	M16	M16	M16	M16	M16	M16	M20	M20	M20	M24	M24	M27	M27	M30	M30	M33
WEIGHT SO kg	1.00	1.00	1.20	1.70	1.80	2.80	3.40	4.70	6.20	10.60	11.80	17.60	23.70	34.10	52.10	68.70	90.80	115.90	162.90
WEIGHT BL kg	1.01	1.07	1.26	1.93	2.08	3.23	4.06	5.77	8.26	14.31	16.84	27.35	40.41	61.47	90.66	125.47	170.7	226.00	343.00

Note: \* Plate flanges less than 12.0mm thickness may suffer unacceptable distortion after welding. these items are typically stocked in 10 or 12mm thickness





AS4087 PN16		15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS	D						11	11	11	13		13	19	19	23	30	30	30	38	48
O D	A						150	165	185	215		280	335	405	455	525	580	640	705	825
PCD	K						114	127	146	178		235	292	356	406	470	521	584	641	756
No BOLTS	n	-	-	-	-	-	4	4	4	4	-	8	8	8	12	12	12	12	16	16
BOLT SIZE	H						M16	M16	M16	M16		M16	M16	M20	M20	M24	M24	M24	M24	M27
WEIGHT SO	kg						1.23	1.44	1.75	2.63		3.90	7.39	10.23	13.93	26.68	30.78	36.27	54.41	88.40
WEIGHT BL	kg						1.50	1.83	2.33	3.75		6.33	13.38	19.54	29.72	51.54	63.25	77.35	118.66	205.37
AS4087 PN21		15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS	D						15	15	15	19		24	24	30	30	30	38	38	48	58
O D	A						165	185	205	230		305	370	430	490	550	610	675	735	850
PCD	K						127	146	165	191		260	324	381	438	495	552	610	673	781
No BOLTS	n	-	-	-	-	-	4	8	8	8	-	12	12	12	16	16	20	20	24	24
BOLT SIZE	H						M16	M16	M16	M16		M20	M20	M24	M24	M27	M27	M30	M30	M33
WEIGHT SO	kg						2.13	2.51	3.01	4.49		8.95	12.64	19.36	23.57	30.65	45.29	53.83	77.32	116.19
WEIGHT BL	kg						2.50	3.05	3.80	6.14		13.44	20.21	34.06	44.18	55.51	86.42	105.88	158.48	257.54
EN1092 PN16		15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS	D	14	16	16	18	18	20	20	20	22	22	24	26	29	32	35	38	42	46	55
O D	A	95	105	115	140	150	165	185	200	220	250	285	340	405	460	520	580	640	715	840
PCD	K	65	75	85	100	110	125	145	160	180	210	240	295	355	410	470	525	585	650	770
No BOLTS	n	4	4	4	4	4	4	8	8	8	8	8	12	12	12	16	16	20	20	20
BOLT SIZE	H	M12	M12	M12	M16	M16	M16	M16	M16	M16	M16	M20	M20	M24	M24	M24	M27	M27	M30	M33
WEIGHT SO	kg	0.69	0.97	1.16	1.90	2.17	2.84	3.35	3.75	4.57	4.57	7.43	10.14	14.83	19.84	29.35	37.46	48.10	66.82	106.05
WEIGHT BL	kg	0.74	1.05	1.28	2.12	2.45	3.33	4.06	4.80	6.47	6.47	11.92	18.33	29.04	41.82	58.35	78.58	105.63	144.59	240.08
EN1092 PN25		15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
THICKNESS	D	14	16	16	18	18	20	22	24	26	28	30	32	35	38	42	48	54	58	68
O D	A	95	105	115	140	150	165	185	200	235	270	300	360	425	485	555	620	670	730	845
PCD	K	65	75	85	100	110	125	145	160	190	220	250	310	370	430	490	550	600	660	770
No BOLTS	n	4	4	4	4	4	4	8	8	8	8	8	12	12	16	16	16	20	20	20
BOLT SIZE	H	M12	M12	M12	M16	M16	M16	M16	M16	M20	M24	M24	M24	M27	M27	M30	M33	M33	M33	M36
WEIGHT SO	kg	0.69	0.97	1.16	1.90	2.17	2.84	3.68	4.50	6.32	8.42	10.68	14.88	21.03	27.80	43.58	60.16	72.73	90.78	132.82
WEIGHT BL	kg	0.74	1.05	1.28	2.12	2.45	3.33	4.47	5.77	8.57	12.14	16.30	24.97	38.17	53.89	78.38	112.11	146.69	188.84	298.54



**90-deg Elbow**

**Cross**

**Tee**

**45-deg Elbow**

**Coupling**

**Half-Coupling**

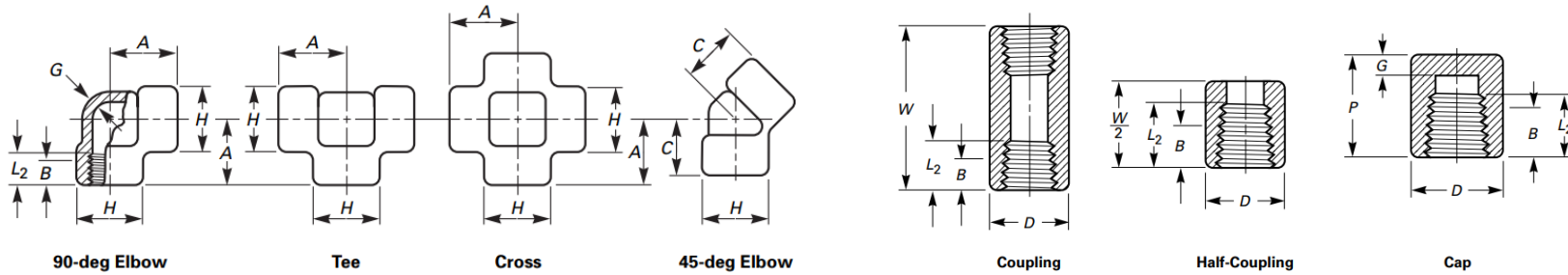
**Cap**

Class 3000		Centre-to-bottom of Socket	Centre-to-bottom of Socket	Socket Bore		Socket Wall		Bore Diameter		Laying Length	Laying Length	Body Wall	End Wall	Tolerances +/- mm		
Note:		1	2	3		3		3								
DN	NPS	A	A	B Max Min		C Avg Min		D Max Min		E	F	G	K	A	E	F
6	1/8	11.0	8.0	11.2	10.8	3.18	3.18	7.6	6.1	6.5	16.0	2.41	4.8	1.0	1.5	1.0
8	1/4	11.0	8.0	14.6	14.2	3.78	3.30	10.0	8.5	6.5	16.0	3.02	4.8	1.0	1.5	1.0
10	3/8	13.5	8.0	18.0	17.6	4.01	3.50	13.3	11.8	6.5	17.5	3.20	4.8	1.5	3.0	1.5
15	1/2	15.5	11.0	22.2	21.8	4.67	4.09	16.6	15.0	9.5	22.5	3.73	6.4	1.5	3.0	1.5
20	3/4	19.0	13.0	27.6	27.2	4.90	4.27	21.7	20.2	9.5	24.0	3.91	6.4	1.5	3.0	1.5
25	1	22.5	14.0	34.3	33.9	5.69	4.98	27.4	25.9	12.5	28.5	4.55	9.6	2.0	4.0	2.0
32	1-1/4	27.0	17.5	43.1	42.7	6.07	5.28	35.8	34.3	12.5	30.0	4.85	9.6	2.0	4.0	2.0
40	1-1/2	32.0	20.5	49.2	48.8	6.35	5.54	41.6	40.1	12.5	32.0	5.08	11.2	2.0	4.0	2.0
50	2	38.0	25.5	61.7	61.2	6.96	6.04	53.3	51.7	19.0	41.0	5.54	12.7	2.0	4.0	2.0
65	2-1/2	41.0	28.5	74.4	73.9	8.76	7.67	64.2	61.2	19.0	43.0	7.01	15.7	2.5	5.0	2.5
80	3	57.0	32.0	90.3	89.8	9.52	8.30	79.4	76.4	19.0	44.5	7.62	19.0	2.5	5.0	2.5
100	4	66.5	41.0	115.7	115.2	10.69	9.35	103.8	100.7	19.0	48.0	8.56	22.4	2.5	5.0	2.5

Note: 1 For 90deg Elbows, Tees and Crosses

2 For 45deg Elbows

3 Average socket wall thickness around periphery shall not be less than the listed value. The minimum value are permitted in localized areas.



Class 3000		Centre-to-end	Centre-to-end	Minimum Length of Thread		OD of Band	Min Wall	Min End Wall	End-to-end Couplings	End-to-end Caps	OD
Note:		1	2	3			4	5			
DN	NPS	A	C	B	L2	H	G (1)	G (2)	W	P	D
6	1/8	21	17	6.4	6.7	22	3.18	4.8	32	19	16
8	1/4	25	19	8.1	10.2	25	3.30	4.8	35	25	19
10	3/8	28	22	9.1	10.4	33	3.51	4.8	38	25	22
15	1/2	33	25	10.9	13.6	38	4.09	6.4	48	32	28
20	3/4	38	28	12.7	13.9	46	4.32	6.4	51	37	35
25	1	44	33	14.7	17.3	56	4.98	9.7	60	41	44
32	1-1/4	51	35	17.0	18.0	62	5.28	9.7	67	44	57
40	1-1/2	60	43	17.8	18.4	75	5.56	11.2	79	44	64
50	2	64	44	19.0	19.2	84	7.14	12.7	86	48	76
65	2-1/2	83	52	23.6	28.9	102	7.65	15.7	92	60	92
80	3	95	64	25.9	30.5	121	8.84	19.0	108	65	108
100	4	114	79	27.7	33.0	152	11.18	22.4	121	68	140

Note: 1 For 90deg Elbows, Tees and Crosses

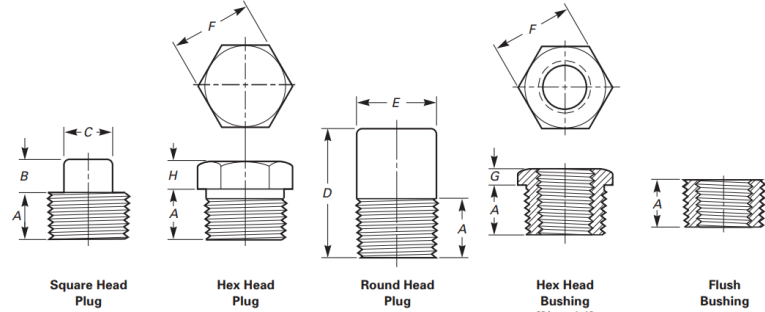
2 For 45deg Elbows

3 Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for Pipe Threads (ASME B1.20.1; see para. 6.3).

4 For 90deg, 45deg Elbows, Tees and Crosses

5 For Couplings, Half Couplings and Caps. The wall thickness away from the threaded ends shall meet the minimum wall thickness requirements of G(1).





Class 3000		Min Length	Min Square Height	Min Width Flats	Min Length	Nominal Head Dia	Nominal Width Flats	Min Hex Height Bush	Min Hex Height Plug
Note:				2			2		
DN	NPS	A	B	C	D	E	F	G	H
6	1/8	10	6	7.15	35	10	11.11	-	6
8	1/4	11	6	9.55	41	14	15.88	3	6
10	3/8	13	8	11.11	41	18	17.46	4	8
15	1/2	14	10	14.29	44	21	22.23	5	8
20	3/4	16	11	15.88	44	27	26.99	6	10
25	1	19	13	20.64	51	33	34.93	6	10
32	1-1/4	21	14	23.81	51	43	44.45	7	14
40	1-1/2	21	16	28.58	51	48	50.80	8	16
50	2	22	18	53.34	64	60	63.50	9	18
65	2-1/2	27	19	38.10	70	73	76.20	10	19
80	3	28	21	42.86	70	89	88.90	10	21
100	4	32	25	63.50	76	114	117.48	13	25

Note: 1 **ASME B16.11 Cautionary Note Regarding Hex Bushings:** Hex head bushings of one-size reduction should not be used in services where they might be subject to harmful loads and forces other than internal pressures.  
 2 Manufacturer's applied tolerance shall ensure dimension will fit U.S. Customary tooling.



## Materials

### Stainless Steel

**Austenitic:** 304/L/H, 316/L/H, 316Ti, 310/H/S, 317/L, 321/H, 347/H, 904L (N08904), 6Mo (S31254)

**Ferritic:** 430, 446-2

**Martensitic:** 410

### Duplex/Super Duplex

S31803, S32205, S32750, S32760

### Nickel Alloy

Alloy 31, 59, 20, 200, 201, C-276, 400, 600, 601, 690, 693, 625, 718, 825, 800H/HT

### Copper Nickel

90/10, EEMUA 7060X, 70/30

### Carbon/High Yield

A, B, C, X42, X46, X52, X56, X60, X65, X70, X80, X90, X100, X120 Galvanised

### Low Temp

1, 3, 6, CC60, CC65, CC70

### Chrome Moly

P1, P2, P5/b/c, P9, P11, P12, P15, P21, P22, P23, P24, P36, P91, P92, P122, P911

### Titanium

Commercially Pure (Grade 1, 2, 3, 4), Ti6Al-4V (Grade 5), Ti 6Al-4V ELI (Grade 23), Ti-Pd (Grade 7), Ti Code 12 (Grade 12)

## Products

### Pipe and Tube

Welded, Seamless, Heat Exchanger, Boiler, Super Heater, Finned

### Buttweld Fittings

Elbows LR & SR  
Induction Bend, Lobster Back  
180, 90, 45 & Custom Angles  
Tees, Reducers, Stub Ends  
Caps, Crosses  
45D Wye Pieces & 45D Tees

### Flanges

Weld Neck, Slip On, Blind, Lap Joint, Socket Weld, Long Weld Neck, Spectacle, Orifice, Spade & Spacer  
150# to 2500#, Table D to Table R, PN6 to PN40

### Pressure Fittings

Elbows, Tees, Couplings, Unions  
Nipples, Bushes, Inserts  
Weldolets, Sockolets  
Threadolets, Nipolets, Latrolets  
Elbolets, Sweepolets  
Nipoflanges, BSPT, NPT, Socket Weld 3000#, 6000#, 9000#

### Long Products

Plate, Sheet & Coil  
Bars Round / Flat / Hex / Angle  
Hollow Section, Channel

### Custom Fittings

Transition Pieces,  
Expansion Joints  
Barred Tees, Nozzles

### Ancillary

Stud Bolts, Gaskets, Flange Covers, Hangers, Clamps

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## Stainless Steel & Duplex

### Pipe - Seamless

TP304/L & TP316/L 15-300NB  
S31803/S32205 25-300NB  
Schedule 10S/40S/80S/160/XXS

### Buttweld Fittings - Seamless

WP304/L & WP316/L 15-300NB  
S31803/S32205 25-300NB  
Schedule 10S/40S/80S/160/XXS  
Elbows L/R 45D & 90D  
Elbows S/R 90D  
Tees Equal & reducing  
Reducers Concentric & Eccentric  
Caps & Stub Ends

### ANSI Flanges

F304/L & F316/L 15-300NB  
F51/F60 25-300NB  
ASME B16.5 Class 150#, 300#,  
600#, 900# & 1500#  
Weld Neck & Slip On  
Socket Weld & Blind  
Threaded BSPT & NPT  
Orifice, Lap Joint, Spectacle  
Blinds, Spades & Spacers

### Table Flanges

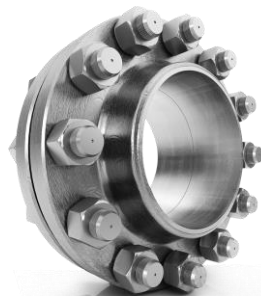
F304/L & F316/L 15-400NB  
AS2129 Table D, E & PN 16  
Slip On Pipe Bore & Blind  
Threaded BSPT & NPT

### Forged Pressure Fittings

F304/L & F316/L 15-300NB  
3000# & 6000# Ratings  
Socket Weld  
Threaded BSPT & NPT  
Elbows 45D & 90D  
Tees Equal & reducing  
Couplings Full, Half & Reducing  
Reducing Bushes,  
Reducing Inserts  
Hex Nipples Equal & Reducing  
Unions, Hex Plugs & Caps  
Pipe Nipples PBE, TOE & TBE  
Swage Nipples Concentric &  
Eccentric

### Branch Outlets

F304/L & F316/L 15-50NB  
3000# & 6000# Ratings  
Socoklets, Weldolet  
Threadolet BSPT & NPT  
Elbolet, Latrolet  
Nipolet, Nipoflange



## Carbon Steel & Galvanised

### Pipe - Seamless

A106-B / A53-B / API 5L-B / X42  
PSL 1  
15-600NB  
Schedule STD / XS / 40 / 80 / 100  
/ 120 / 140 / 160 / XXS

### Pipe - Welded

A53-B / API 5L-B / X42 PSL 1  
AS/NZS 1163 C350 LO  
50-1200NB  
Schedule STD / XS / 40 / 80

### Buttweld Fittings

WPB Seamless 15-600NB  
WPB WX 750-900NB  
Schedule STD / XS / 40 / 80 / 100  
/ 120 / 140 / 160 / XXS  
Elbows L/R 45D & 90D  
Elbows S/R 90D  
Tees Equal & reducing  
Reducers Concentric & Eccentric  
Caps

### 3D Bends

A234-WPB Seamless 50-300NB  
Schedule STD & XS  
45D & 90D with 300mm  
Tangents

### ANSI Flanges

A105N 15-600NB  
ASME B16.5 Class 150#, 300#,  
600#, 900# & 1500#  
Weld Neck & Slip On  
Socket Weld & Blind  
Threaded BSPT & NPT  
Orifice, Lap Joint, Spectacle  
Blinds, Spades & Spacers  
ASME B16.47 Class 150# Series A  
BS3293 Class 150# 750-900NB

### Table Flanges

A105N 15-1200NB  
AS2129 Table D, E & PN 16  
Slip On Pipe Bore & Blind  
Threaded BSPT & NPT

### Forged Pressure Fittings

A105N 15-100NB  
3000# & 6000# Ratings  
Socket Weld  
Threaded BSPT & NPT  
Elbows 45D & 90D  
Tees Equal & reducing  
Couplings Full, Half & Reducing  
Reducing Bushes  
Reducing Inserts  
Hex Nipples Equal & Reducing  
Unions, Hex Plugs & Caps  
Pipe Nipples PBE, TOE & TBE  
Swage Nipples Conc & Ecc

### Branch Outlets

A105N 15-150NB  
3000# & 6000# Ratings  
Socoklets, Weldolet  
Threadolet BSPT & NPT  
Elbolet, Latrolet  
Nipolet, Nipoflange

### Galvanised Pipe

A106-B Pipe Seamless  
Ends: Plain, BSPT & NPT  
15-20NB Schedule XS  
25-50NB Schedule STD & XS

### Galvanised Pressure Fittings

A105N 15-50NB  
3000# Rating  
Threaded BSPT & NPT  
Elbows 45D & 90D  
Tees Equal  
Couplings Full & Reducing  
Reducing Bushes



PIPE

FITTINGS

FLANGES



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