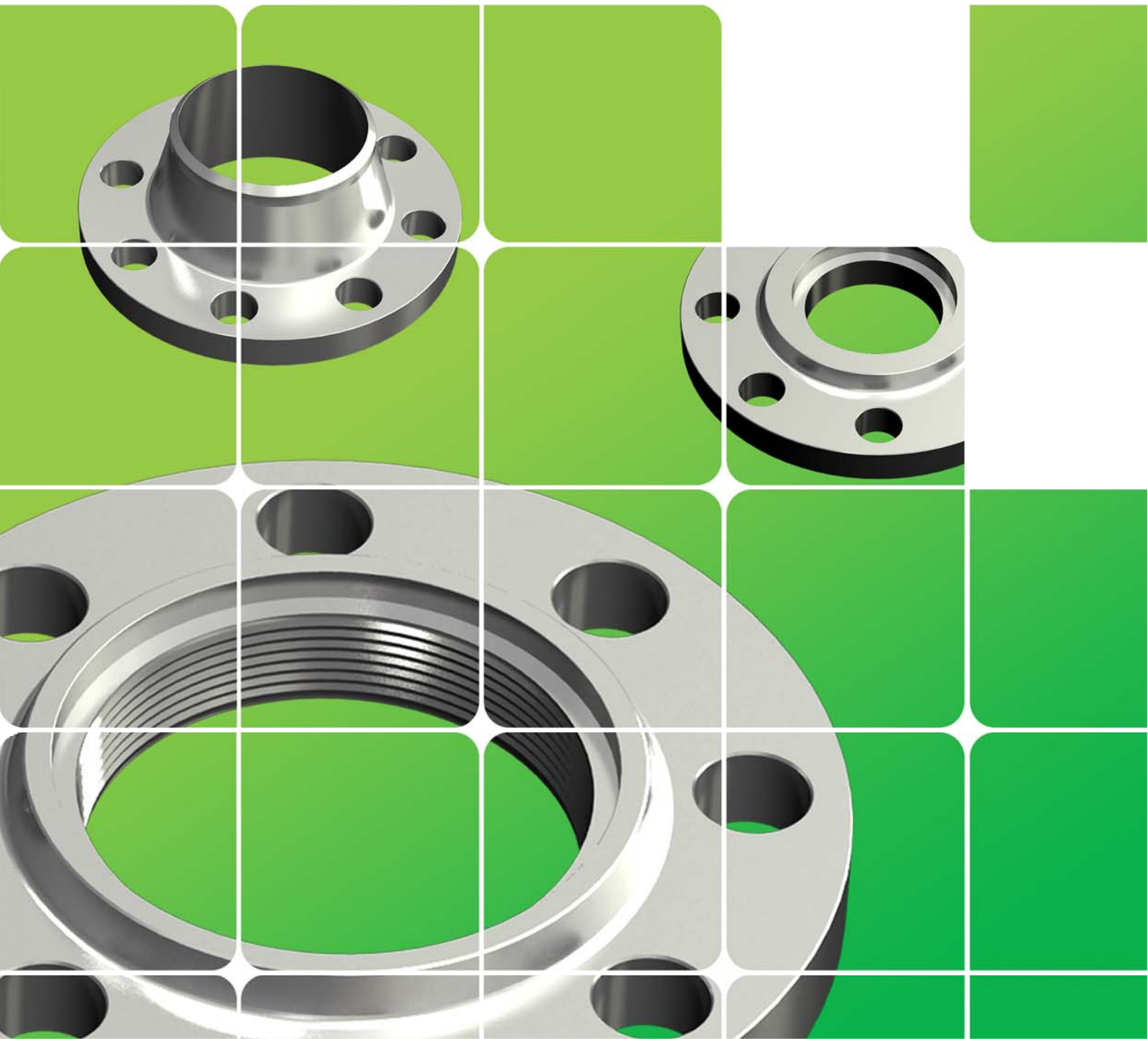


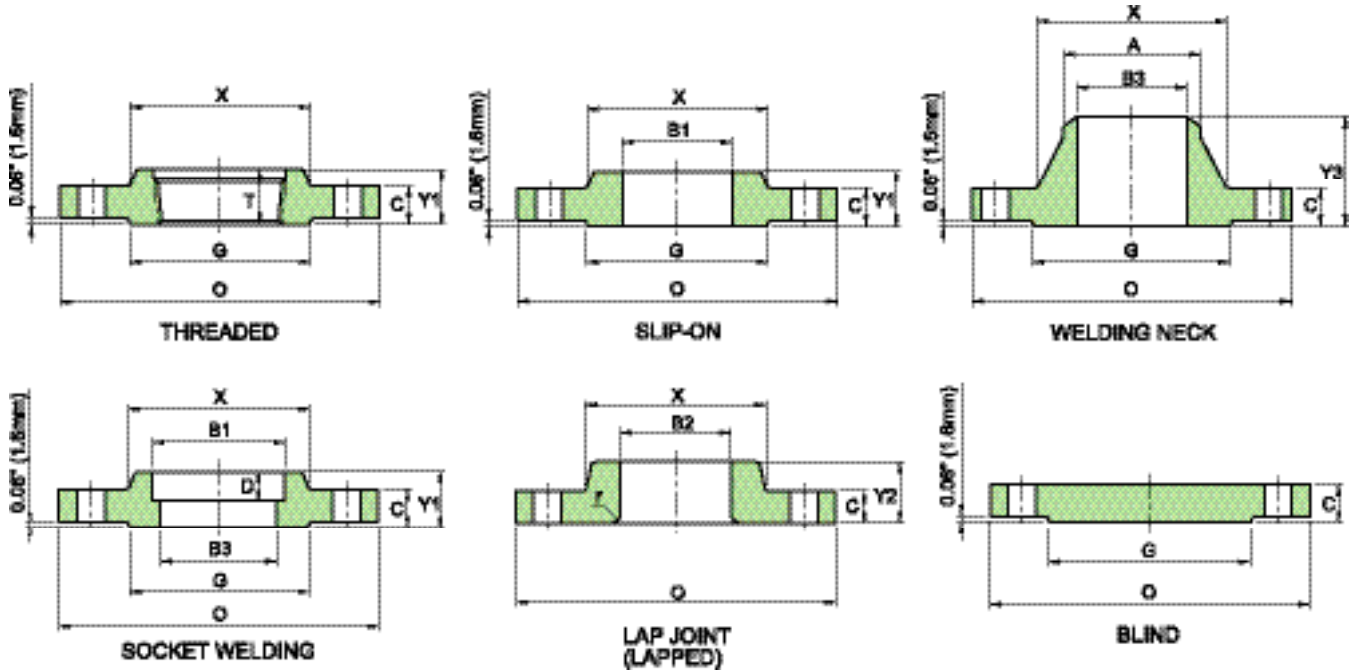
ANSI FLANGES

- Class 150 Flanges
- Class 300 Flanges
- Class 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges
- Approximate weight of Flanges
- Tolerance
- Welded and seamless pipe carbon and alloy steels
- Welded and seamless pipe stainless steels
- Material Specifications



CLASS 150 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : inch

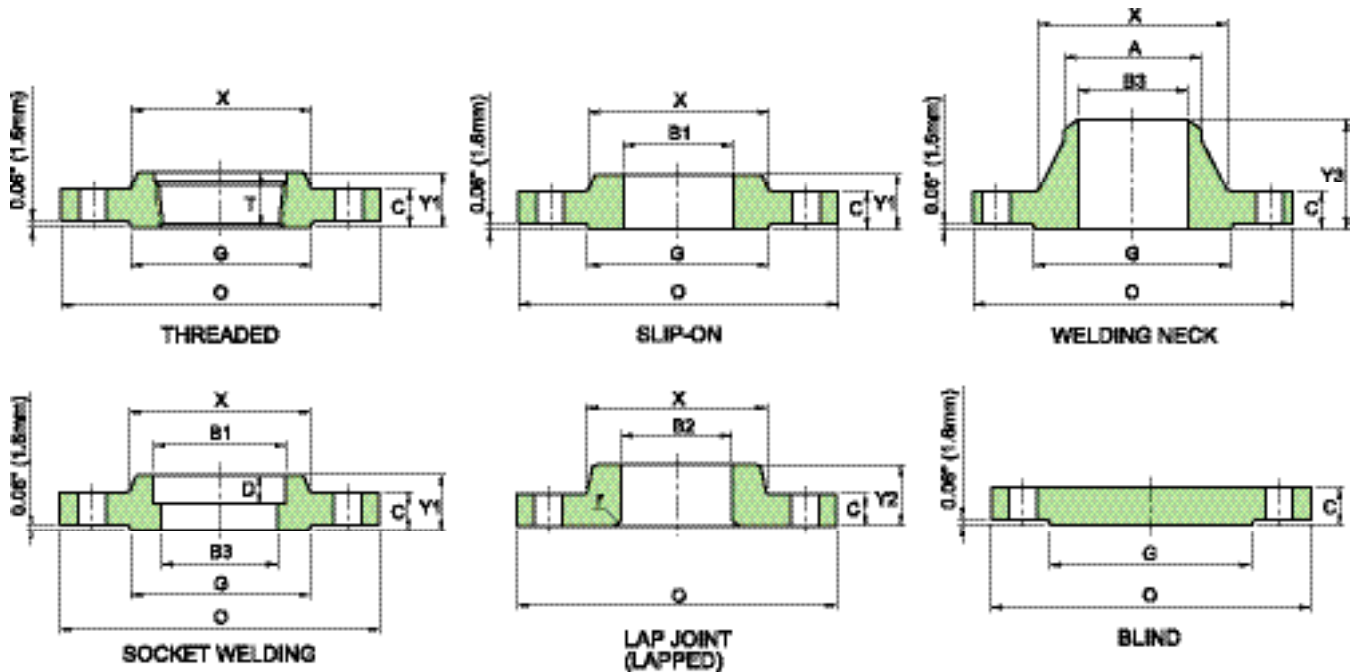
Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	O.D. of Raised Face	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS		
						Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding			Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Machine Bolts		Stud Bolts
																			Y1	Y2	
O	C	X	G	A	Y1	Y2	Y3	T	B1	B2	B3	r	D								
1/2	3.50	0.44	1.19	1.38	0.84	0.62	0.62	1.88	0.62	0.88	0.90	0.62	0.12	0.38	2.38	0.62	4	1/2	2.00	2.25	-
3/4	3.88	0.50	1.50	1.69	1.05	0.62	0.62	2.06	0.62	1.09	1.11	0.82	0.12	0.44	2.75	0.62	4	1/2	2.00	2.50	-
1	4.25	0.56	1.94	2.00	1.32	0.69	0.69	2.19	0.69	1.36	1.38	1.05	0.12	0.50	3.12	0.62	4	1/2	2.25	2.50	3.00
1 1/4	4.62	0.62	2.31	2.50	1.66	0.81	0.81	2.25	0.81	1.70	1.72	1.38	0.19	0.56	3.50	0.62	4	1/2	2.25	2.75	3.25
1 1/2	5.00	0.69	2.56	2.88	1.90	0.88	0.88	2.44	0.88	1.95	1.97	1.61	0.25	0.62	3.88	0.62	4	1/2	2.50	2.75	3.25
2	6.00	0.75	3.06	3.62	2.38	1.00	1.00	2.50	1.00	2.44	2.46	2.07	0.31	0.69	4.75	0.75	4	5/8	2.75	3.25	3.75
2 1/2	7.00	0.88	3.56	4.12	2.88	1.12	1.12	2.75	1.12	2.94	2.97	2.47	0.31	0.75	5.50	0.75	4	5/8	3.00	3.50	4.00
3	7.50	0.94	4.25	5.00	3.50	1.19	1.19	2.75	1.19	3.57	3.60	3.07	0.38	0.81	6.00	0.75	4	5/8	3.00	3.50	4.00
3 1/2	8.50	0.94	4.81	5.50	4.00	1.25	1.25	2.81	1.25	4.07	4.10	3.55	0.38	-	7.00	0.75	8	5/8	3.00	3.50	4.00
4	9.00	0.94	5.31	6.19	4.50	1.31	1.31	3.00	1.31	4.57	4.60	4.03	0.44	-	7.50	0.75	8	5/8	3.00	3.50	4.00
5	10.00	0.94	6.44	7.31	5.56	1.44	1.44	3.50	1.44	5.66	5.69	5.05	0.44	-	8.50	0.88	8	3/4	3.25	3.75	4.25
6	11.00	1.00	7.56	8.50	6.63	1.56	1.56	3.50	1.56	6.72	6.75	6.07	0.50	-	9.50	0.88	8	3/4	3.25	4.00	4.50
8	13.50	1.12	9.69	10.62	8.63	1.75	1.75	4.00	1.75	8.72	8.75	7.98	0.50	-	11.75	0.88	8	3/4	3.50	4.25	4.75
10	16.00	1.19	12.00	12.75	10.75	1.94	1.94	4.00	1.94	10.88	10.92	10.02	0.50	-	14.25	1.00	12	7/8	4.00	4.50	5.00
12	19.00	1.25	14.38	15.00	12.75	2.19	2.19	4.50	2.19	12.88	12.92	12.00	0.50	-	17.00	1.00	12	7/8	4.00	4.75	5.25
14	21.00	1.38	15.75	16.25	14.00	2.25	3.12	5.00	2.25	14.14	14.18		0.50	-	18.75	1.12	12	1	4.50	5.25	5.75
16	23.50	1.44	18.00	18.50	16.00	2.50	3.44	5.00	2.50	16.16	16.19		0.50	-	21.25	1.12	16	1	4.50	5.25	5.75
18	25.00	1.56	19.88	21.00	18.00	2.69	3.81	5.50	2.69	18.18	18.20		0.50	-	22.75	1.25	16	1 1/8	5.00	5.75	6.25
20	27.50	1.69	22.00	23.00	20.00	2.88	4.06	5.69	2.88	20.20	20.25		0.50	-	25.00	1.25	20	1 1/8	5.50	6.25	6.75
24	32.00	1.88	26.12	27.25	24.00	3.25	4.38	6.00	3.25	24.25	24.25		0.50	-	29.50	1.38	20	1 1/4	6.00	6.75	7.25

NOTE :

- Class 150 flanges except Lap Joint will be furnished with 0.06 " (1.6mm) raised face, which is included in 'Thickness' (C) and 'Length through Hub' (Y1), (Y3).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

CLASS 150 FLANGES

ANSI B 16.5 FORGED FLANGES



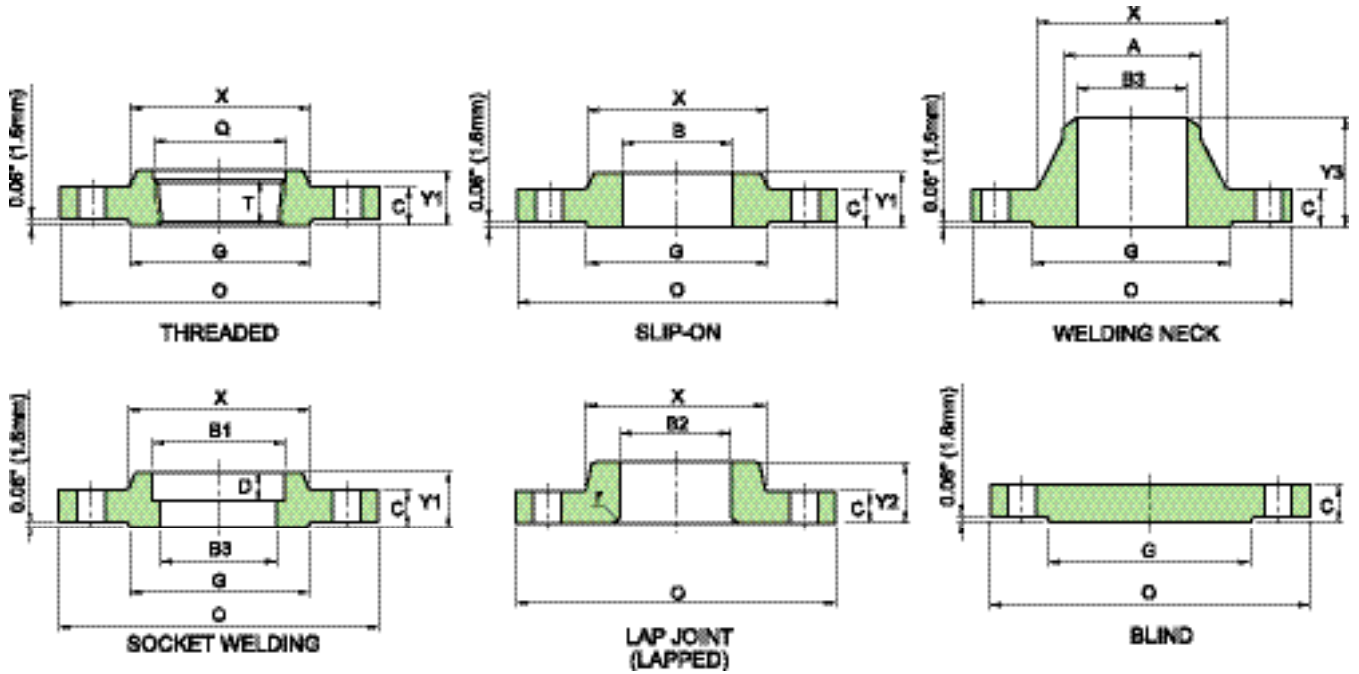
Unit : mm

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	O.D of Raised Face	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS		
						Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding			Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts (inch)	Machine Bolts		Stud Bolts
																			Y1	Y2	
O	C	X	G	A	Y1	Y2	Y3	T	B1	B2	B3	r	D								
15	89.0	11.2	30.2	35.1	21.3	15.7	15.7	47.8	15.7	22.4	22.9	15.8	3.0	9.7	60.5	15.8	4	1/2	50.8	57.2	-
20	98.5	12.7	38.1	42.9	26.7	15.7	15.7	52.3	15.7	27.7	28.2	20.8	3.0	11.2	69.9	15.8	4	1/2	50.8	63.5	-
25	108.0	14.2	49.3	50.8	33.5	17.5	17.5	55.6	17.5	34.5	35.1	26.7	3.0	12.7	79.3	15.8	4	1/2	57.2	63.5	76.2
32	117.5	15.7	58.7	63.5	42.2	20.6	20.6	57.2	20.6	43.2	43.7	35.1	4.8	14.2	88.9	15.8	4	1/2	57.2	69.9	82.6
40	127.0	17.5	65.0	73.2	48.3	22.4	22.4	62.0	22.4	49.5	50.0	40.9	6.4	15.8	98.6	15.8	4	1/2	63.5	69.9	82.6
50	152.5	19.1	77.7	91.9	60.5	25.4	25.4	63.5	25.4	62.0	62.5	52.6	7.9	17.5	120.7	19.1	4	5/8	69.9	82.6	95.3
65	178.0	22.4	90.4	104.6	73.2	28.4	28.4	69.9	28.4	74.7	75.4	62.7	7.9	19.1	139.7	19.1	4	5/8	76.2	88.9	101.6
80	190.5	23.9	108.0	127.0	88.9	30.2	30.2	69.9	30.2	90.7	91.4	78.0	9.7	20.6	152.4	19.1	4	5/8	76.2	88.9	101.6
90	216.0	23.9	122.2	139.7	101.6	31.8	31.8	71.4	31.8	103.4	104.1	90.2	9.7	-	177.8	19.1	8	5/8	76.2	88.9	101.6
100	228.5	23.9	134.9	157.2	114.3	33.3	33.3	76.2	33.3	116.1	116.8	102.4	11.2	-	190.5	19.1	8	5/8	76.2	88.9	101.6
125	254.0	23.9	163.6	185.7	141.2	36.6	36.6	88.9	36.6	143.8	144.5	128.3	11.2	-	215.9	22.4	8	3/4	82.6	95.3	108.0
150	279.5	25.4	192.0	215.9	168.4	39.6	39.6	88.9	39.6	170.7	171.5	154.2	12.7	-	241.3	22.4	8	3/4	82.6	101.6	114.3
200	343.0	28.4	246.1	269.7	219.2	44.5	44.5	101.6	44.5	221.5	222.3	202.7	12.7	-	298.5	22.4	8	3/4	88.9	108.0	120.7
250	406.5	30.2	304.8	323.9	273.1	49.3	49.3	101.6	49.3	276.4	277.4	254.5	12.7	-	362.0	25.4	12	7/8	101.6	114.3	127.0
300	482.5	31.8	365.3	381.0	323.9	55.6	55.6	114.3	55.6	327.2	328.2	304.8	12.7	-	431.8	25.4	12	7/8	101.6	120.7	133.4
350	533.5	35.1	400.1	412.8	355.6	57.2	79.2	127.0	57.2	359.2	360.2	-	12.7	-	476.3	28.5	12	1	114.3	133.4	146.1
400	597.0	36.6	457.2	469.9	406.4	63.5	87.4	127.0	63.5	410.5	411.2	-	12.7	-	539.8	28.5	16	1	114.3	133.4	146.1
450	635.0	39.6	505.0	533.4	457.2	68.3	96.8	139.7	68.3	461.8	462.3	-	12.7	-	577.9	31.8	16	1 1/8	127.0	146.1	158.8
500	698.5	42.9	558.8	584.2	508.0	73.2	103.1	144.5	73.2	513.1	514.4	-	12.7	-	635.0	31.8	20	1 1/8	139.7	158.8	171.5
600	813.0	47.8	663.4	692.2	609.6	82.6	111.3	152.4	82.6	616.0	616.0	-	12.7	-	749.3	35.1	20	1 1/4	152.4	171.5	184.2

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (C).
- Depth of Socket (D) is covered by ANSI B 16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.

CLASS 300 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : inch

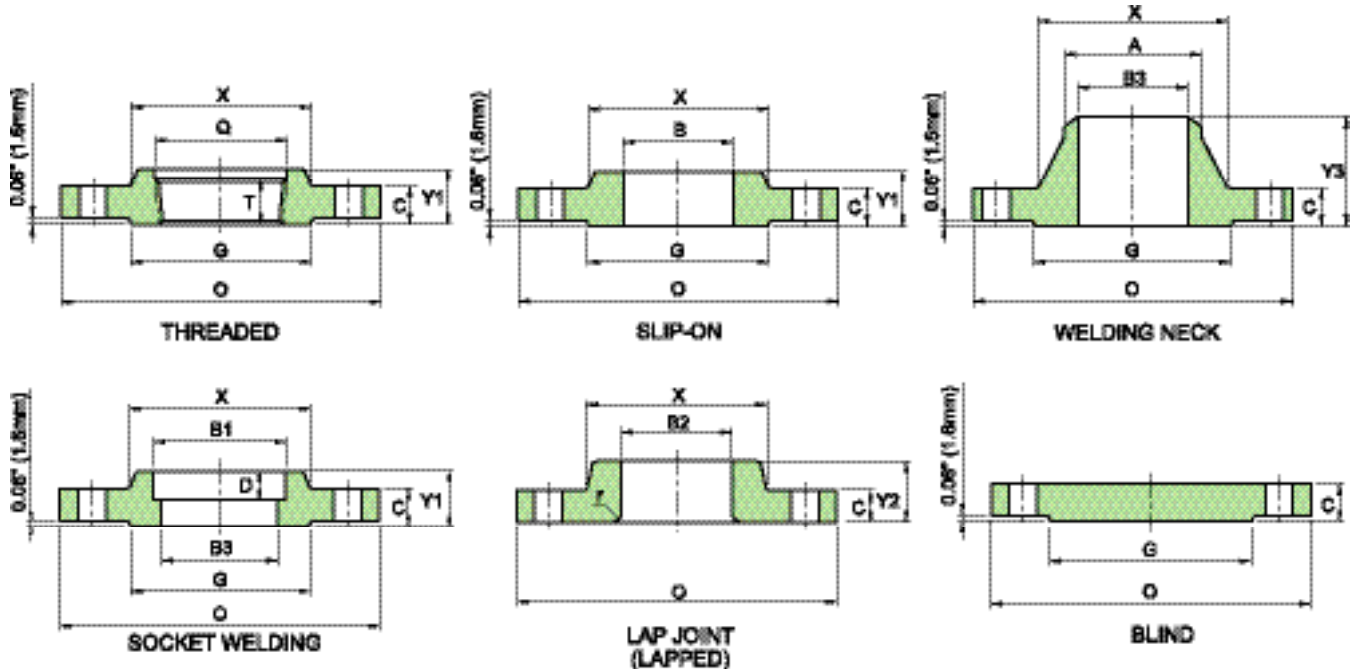
Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	O.D. of Raised Face	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Comer Radius of Bore of Lapped Flange	Counter Bore Threaded Flange Min.	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS		
						Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding				Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Machine Bolts		Stud Bolts
																				Y1	Y2	
O	C	X	G	A	Y1	Y2	Y3	T	B1	B2	B3	r	Q	D								
1/2	3.75	0.56	1.50	1.38	0.84	0.88	0.88	2.06	0.62	0.88	0.90	0.62	0.12	0.93	0.38	2.62	0.62	4	1/2	2.25	2.50	3.00
3/4	4.62	0.62	1.88	1.69	1.05	1.00	1.00	2.25	0.62	1.09	1.11	0.82	0.12	1.14	0.44	3.25	0.75	4	5/8	2.50	3.00	3.50
1	4.88	0.69	2.12	2.00	1.32	1.06	1.06	2.44	0.69	1.36	1.38	1.05	0.12	1.41	0.50	3.50	0.75	4	5/8	2.50	3.00	3.50
1 1/4	5.25	0.75	2.50	2.50	1.66	1.06	1.06	2.56	0.81	1.70	1.72	1.38	0.19	1.75	0.56	3.88	0.75	4	5/8	2.75	3.25	3.75
1 1/2	6.12	0.81	2.75	2.88	1.90	1.19	1.19	2.69	0.88	1.95	1.97	1.61	0.25	1.98	0.62	4.50	0.88	4	3/4	3.00	3.50	4.00
2	6.50	0.88	3.31	3.62	2.38	1.31	1.31	2.75	1.12	2.44	2.46	2.07	0.31	2.50	0.69	5.00	0.75	8	5/8	3.00	3.50	4.00
2 1/2	7.50	1.00	3.94	4.12	2.88	1.50	1.50	3.00	1.25	2.94	2.97	2.47	0.31	3.00	0.75	5.88	0.88	8	3/4	3.25	4.00	4.50
3	8.25	1.12	4.62	5.00	3.50	1.69	1.69	3.12	1.25	3.57	3.60	3.07	0.38	3.63	0.81	6.62	0.88	8	3/4	3.50	4.25	4.75
3 1/2	9.00	1.19	5.25	5.50	4.00	1.75	1.75	3.19	1.44	4.07	4.10	3.55	0.38	4.13	-	7.25	0.88	8	3/4	3.75	4.25	5.00
4	10.00	1.25	5.75	6.19	4.50	1.88	1.88	3.38	1.44	4.57	4.60	4.03	0.44	4.63	-	7.88	0.88	8	3/4	3.75	4.50	5.00
5	11.00	1.38	7.00	7.31	5.56	2.00	2.00	3.88	1.69	5.66	5.69	5.05	0.44	5.69	-	9.25	0.88	8	3/4	4.25	4.75	5.25
6	12.50	1.44	8.12	8.50	6.63	2.06	2.06	3.88	1.81	6.72	6.75	6.07	0.50	6.75	-	10.62	0.88	12	3/4	4.25	4.75	5.50
8	15.00	1.62	10.25	10.62	8.63	2.44	2.44	4.38	2.00	8.72	8.75	7.98	0.50	8.75	-	13.00	1.00	12	7/8	4.75	5.50	6.00
10	17.50	1.88	12.62	12.75	10.75	2.62	3.75	4.62	2.19	10.88	10.92	10.02	0.50	10.88	-	15.25	1.12	16	1	5.50	6.25	6.75
12	20.50	2.00	14.75	15.00	12.75	2.88	4.00	5.12	2.38	12.88	12.92	12.00	0.50	12.94	-	17.75	1.25	16	1 1/8	5.75	6.75	7.25
14	23.00	2.12	16.75	16.25	14.00	3.00	4.38	5.62	2.50	14.14	14.18	12.00	0.50	14.19	-	20.25	1.25	20	1 1/8	6.25	7.00	7.50
16	25.50	2.25	19.00	18.50	16.00	3.25	4.75	5.75	2.69	16.16	16.19	12.00	0.50	16.19	-	22.50	1.38	20	1 1/4	6.50	7.50	8.00
18	28.00	2.38	21.00	21.00	18.00	3.50	5.12	6.25	2.75	18.18	18.20	12.00	0.50	18.19	-	24.75	1.38	24	1 1/4	6.75	7.75	8.25
20	30.50	2.50	23.12	23.00	20.00	3.75	5.50	6.38	2.88	20.20	20.25	12.00	0.50	20.19	-	27.00	1.38	24	1 1/4	7.25	8.00	8.75
24	36.00	2.75	27.62	27.25	24.00	4.19	6.00	6.62	3.25	24.25	24.25	12.00	0.50	24.19	-	32.00	1.62	24	1 1/2	8.00	9.00	10.00

NOTE :

- Class 300 flanges except Lap Joint will be furnished with 0.06 " (1.6mm) raised face, which is included in 'Thickness' (C) and 'Length through Hub' (Y1), (Y3).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

CLASS 300 FLANGES

ANSI B 16.5 FORGED FLANGES



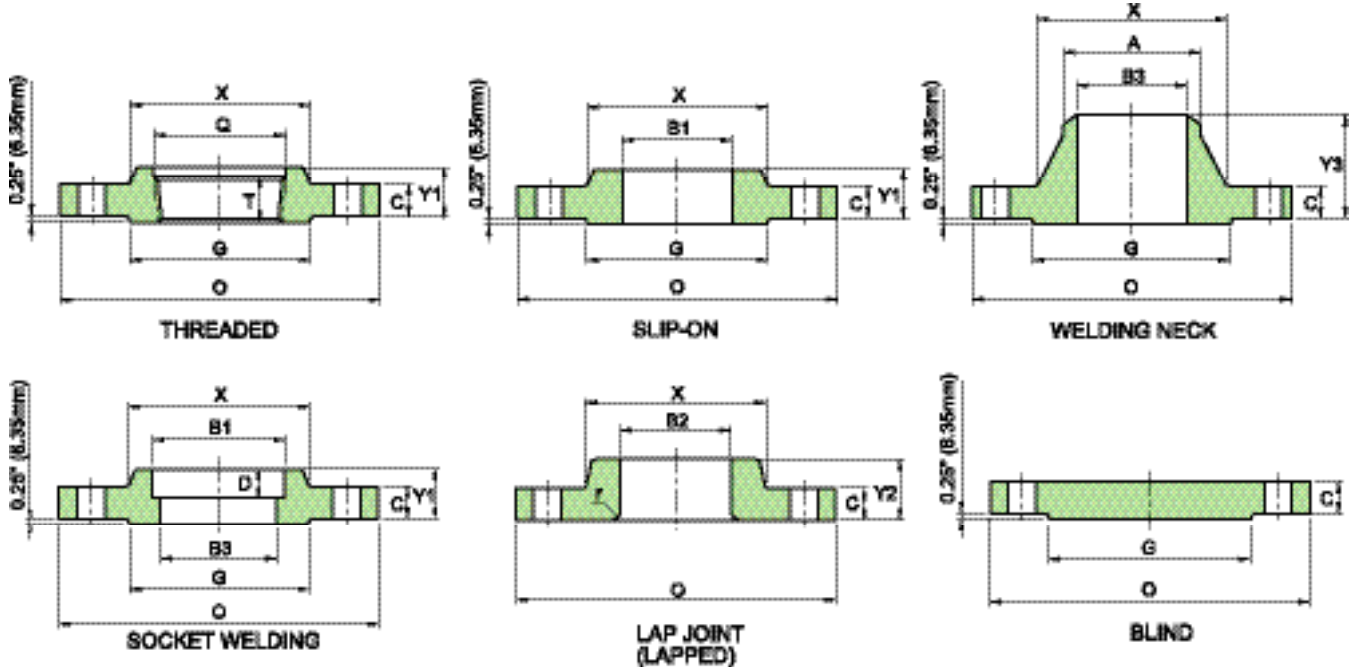
Unit : mm

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	O.D. of Raised Face	Hub Diam. Chamfer of W.N.	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter Bore Threaded Flange Min.	Depth of Socket	DRILLING			LENGTH OF STUD BOLTS			
						Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding				Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts (inch)	Machine Bolts		Stud Bolts
																				Y1	Y2	
15	95.5	14.2	38.1	35.1	21.3	22.4	22.4	52.3	15.7	22.4	22.9	15.7	3.0	23.6	9.7	66.5	15.7	4	1/2	57.2	63.5	76.2
20	117.5	15.7	47.8	42.9	26.7	25.4	25.4	57.2	15.7	27.7	28.2	20.8	3.0	29.0	11.2	82.6	19.1	4	5/8	63.5	76.2	88.9
25	124.0	17.5	53.8	50.8	33.5	26.9	26.9	62.0	17.5	34.5	35.1	26.7	3.0	35.8	12.7	88.9	19.1	4	5/8	63.5	76.2	88.9
32	133.5	19.1	63.5	63.5	42.2	26.9	26.9	65.0	20.6	43.2	43.7	35.1	4.8	44.5	14.2	98.6	19.1	4	5/8	69.9	82.6	95.3
40	155.5	20.6	69.9	73.2	48.3	30.2	30.2	68.3	22.4	49.5	50.0	40.9	6.4	50.5	15.7	114.3	22.4	4	3/4	76.2	88.9	101.6
50	165.0	22.4	84.1	91.9	60.5	33.3	33.3	69.9	28.4	62.0	62.5	52.6	7.9	63.5	17.5	127.0	19.1	8	5/8	76.2	88.9	101.6
65	190.5	25.4	100.1	104.6	73.2	38.1	38.1	76.2	31.8	74.7	75.4	62.7	7.9	76.2	19.1	149.4	22.4	8	3/4	82.6	101.6	114.3
80	209.5	28.4	117.3	127.0	88.9	42.9	42.9	79.2	31.8	90.7	91.4	78.0	9.7	92.2	20.6	168.1	22.4	8	3/4	88.9	108.0	120.7
90	228.5	30.2	133.4	139.7	101.6	44.5	44.5	81.0	36.6	103.4	104.1	90.2	9.7	104.9	22.4	184.2	22.4	8	3/4	95.3	108.0	127.0
100	254.0	31.8	146.1	157.2	114.3	47.8	47.8	85.9	36.6	116.1	116.8	102.4	11.2	117.6	-	200.2	22.4	8	3/4	95.3	114.3	127.0
125	279.5	35.1	177.8	185.7	141.2	50.8	50.8	98.6	42.9	143.8	144.5	128.3	11.2	144.5	-	235.0	22.4	8	3/4	108.0	120.7	133.4
150	317.5	36.6	206.2	215.9	168.4	52.3	52.3	98.6	46.0	170.7	171.5	154.2	12.7	171.5	-	269.7	22.4	12	3/4	108.0	120.7	139.7
200	381.0	41.1	260.4	269.7	219.2	62.0	62.0	111.3	50.8	221.5	222.3	202.7	12.7	222.3	-	330.2	25.4	12	7/8	120.7	139.7	152.4
250	444.5	47.8	320.5	323.9	273.1	66.5	95.3	117.3	55.6	276.4	277.4	254.5	12.7	276.4	-	387.4	28.4	16	1	139.7	158.8	171.5
300	520.5	50.8	374.7	381.0	323.9	73.2	101.6	130.0	60.5	327.2	328.2	304.8	12.7	328.7	-	450.9	31.8	16	1 1/8	146.1	171.5	184.2
350	584.0	53.8	425.5	412.8	355.6	76.2	111.3	142.7	63.5	359.2	360.2		12.7	360.4	-	514.4	31.8	20	1 1/8	158.8	177.8	190.5
400	647.5	57.2	482.6	469.9	406.4	82.6	120.7	146.1	68.3	410.5	411.2		12.7	411.2	-	571.5	35.1	20	1 1/4	165.1	190.5	203.2
450	711.0	60.5	533.4	533.4	457.2	88.9	130.0	158.8	69.9	461.8	462.3		12.7	462.0	-	628.7	35.1	24	1 1/4	171.5	196.9	209.6
500	774.5	63.5	587.2	584.2	508.0	95.3	139.7	162.1	73.2	513.1	514.4		12.7	512.8	-	685.8	35.1	24	1 1/4	184.2	203.2	222.3
600	914.5	69.9	701.5	692.2	609.6	106.4	152.4	168.1	82.6	616.0	616.0		12.7	614.4	-	812.8	41.1	24	1 1/2	203.2	228.6	254.0

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (C).
- Depth of Socket (D) is covered by ANSI B 16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.

CLASS 600 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : inch

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	O.D. of Raised Face	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter Bore Threaded Flange Min.	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS		
						Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding				Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint
	O	C	X	G	A	Y1	Y2	Y3	T	B1	B2	B3	r	Q	D							
1/2	3.75	0.56	1.50	1.38	0.84	0.88	0.88	2.06	0.62	0.88	0.90		0.12	0.93	0.38	2.62	0.62	4	1/2	3.00	2.75	3.00
3/4	4.62	0.62	1.88	1.69	1.05	1.00	1.00	2.25	0.62	1.09	1.11		0.12	1.14	0.44	3.25	0.75	4	5/8	3.50	3.25	3.50
1	4.88	0.69	2.12	2.00	1.32	1.06	1.06	2.44	0.69	1.36	1.38		0.12	1.41	0.50	3.50	0.75	4	5/8	3.50	3.25	3.50
1 1/4	5.25	0.81	2.50	2.50	1.66	1.12	1.12	2.62	0.81	1.70	1.72		0.19	1.75	0.56	3.88	0.75	4	5/8	3.75	3.50	3.75
1 1/2	6.12	0.88	2.75	2.88	1.90	1.25	1.25	2.75	0.88	1.95	1.97		0.25	1.99	0.62	4.50	0.88	4	3/4	4.25	4.00	4.25
2	6.50	1.00	3.31	3.62	2.38	1.44	1.44	2.88	1.12	2.44	2.46		0.31	2.50	0.69	5.00	0.75	8	5/8	4.25	4.00	4.25
2 1/2	7.50	1.12	3.94	4.12	2.88	1.62	1.62	3.12	1.25	2.94	2.97		0.31	3.00	0.75	5.88	0.88	8	3/4	4.75	4.50	4.75
3	8.25	1.25	4.62	5.00	3.50	1.81	1.81	3.25	1.38	3.57	3.60		0.38	3.63	0.81	6.62	0.88	8	3/4	5.00	4.75	5.00
3 1/2	9.00	1.38	5.25	5.50	4.00	1.94	1.94	3.38	1.56	4.07	4.10		0.38	4.13	-	7.25	1.00	8	7/8	5.50	5.25	5.50
4	10.75	1.50	6.00	6.19	4.50	2.12	2.12	4.00	1.62	4.57	4.60		0.44	4.63	-	8.50	1.00	8	7/8	5.75	5.50	5.75
5	13.00	1.75	7.44	7.31	5.56	2.38	2.38	4.50	1.88	5.66	5.69		0.44	5.69	-	10.50	1.12	8	1	6.50	6.25	6.50
6	14.00	1.88	8.75	8.50	6.63	2.62	2.62	4.62	2.00	6.72	6.75		0.50	6.75	-	11.50	1.12	12	1	6.75	6.50	6.75
8	16.50	2.19	10.75	10.62	8.63	3.00	3.00	5.25	2.25	8.72	8.75		0.50	8.75	-	13.75	1.25	12	1 1/8	7.50	7.25	7.75
10	20.00	2.50	13.50	12.75	10.75	3.38	4.38	6.00	2.56	10.88	10.92		0.50	10.88	-	17.00	1.38	16	1 1/4	8.50	8.25	8.50
12	22.00	2.62	15.75	15.00	12.75	3.62	4.62	6.12	2.75	12.88	12.92		0.50	12.94	-	19.25	1.38	20	1 1/4	8.75	8.50	8.75
14	23.75	2.75	17.00	16.25	14.00	3.69	5.00	6.50	2.88	14.14	14.18		0.50	14.19	-	20.75	1.50	20	1 3/8	9.25	9.00	9.25
16	27.00	3.00	19.50	18.50	16.00	4.19	5.50	7.00	3.06	16.16	16.19		0.50	16.19	-	23.75	1.62	20	1 1/2	10.00	9.75	10.00
18	29.25	3.25	21.50	21.00	18.00	4.62	6.00	7.25	3.12	18.18	18.20		0.50	18.19	-	25.75	1.75	20	1 5/8	10.75	10.50	10.75
20	32.00	3.50	24.00	23.00	20.00	5.00	6.50	7.50	3.25	20.20	20.25		0.50	20.19	-	28.50	1.75	24	1 5/8	11.25	11.00	11.50
24	37.00	4.00	28.25	27.25	24.00	5.50	7.25	8.00	3.62	24.25	24.25		0.50	24.19	-	33.00	2.00	24	1 7/8	13.00	12.75	13.25

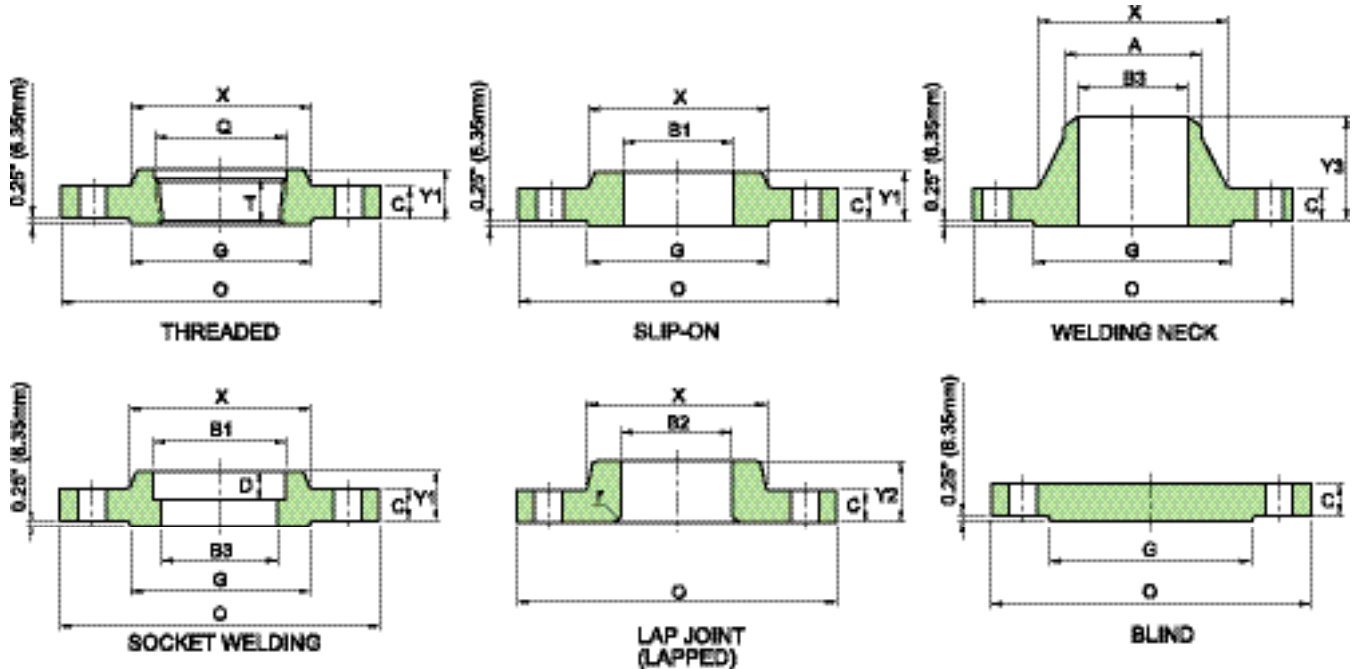
To be specified by purchaser.

NOTE :

- Class 600 flanges except Lap Joint will be furnished with 0.25 " (6.35mm) raised face, which is not included in 'Thickness' (C) and 'Length through Hub' (Y1), (Y3).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

CLASS 600 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : mm

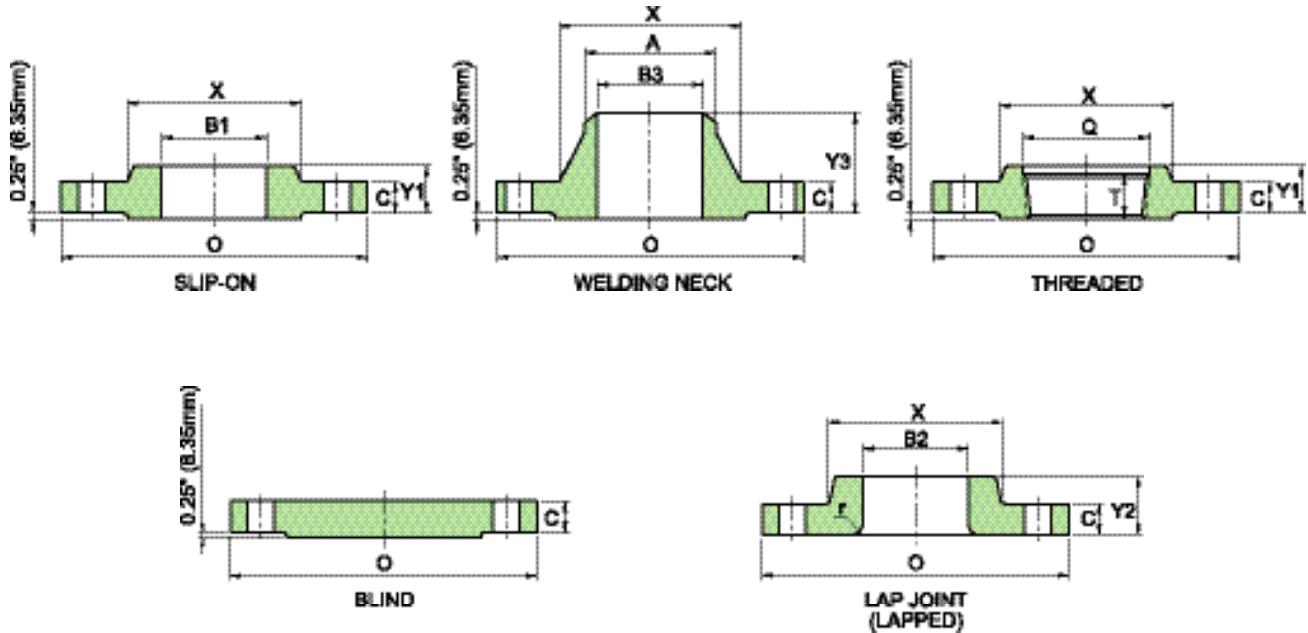
Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	O.D. of Raised Face	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter Bore Threaded Flange Min.	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS		
						Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding				Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint
	O	C	X	G	A	Y1	Y2	Y3	T	B1	B2	B3	r	Q	D							
15	95.5	14.2	38.1	35.1	21.3	22.4	22.4	52.3	15.7	22.4	22.9		3.0	23.6	9.7	66.5	15.7	4	1/2	76.2	69.9	76.2
20	117.5	15.7	47.8	42.9	26.7	25.4	25.4	57.2	15.7	27.7	28.2		3.0	29.0	11.2	82.6	19.1	4	5/8	88.9	82.6	88.9
25	124.0	17.5	53.8	50.8	33.5	26.9	26.9	62.0	17.5	34.5	35.1		3.0	35.8	12.7	88.9	19.1	4	5/8	88.9	82.6	88.9
32	133.5	20.6	63.5	63.5	42.2	28.4	28.4	66.5	20.6	43.2	43.7		4.8	44.5	14.2	98.6	19.1	4	5/8	95.3	88.9	95.3
40	155.5	22.4	69.9	73.2	48.3	31.8	31.8	69.9	22.4	49.5	50.0		6.4	50.5	15.7	114.3	22.4	4	3/4	108.0	101.6	108.0
50	165.0	25.4	84.1	91.9	60.5	36.6	36.6	73.2	28.4	62.0	62.5		7.9	63.5	17.5	127.0	19.1	8	5/8	108.0	101.6	108.0
65	190.5	28.4	100.1	104.6	73.2	41.1	41.1	79.2	31.8	74.7	75.4		7.9	76.2	19.1	149.4	22.4	8	3/4	120.7	114.3	120.7
80	209.5	31.8	117.3	127.0	88.9	46.0	46.0	82.6	35.1	90.7	91.4		9.7	92.2	20.6	168.1	22.4	8	3/4	127.0	120.7	127.0
90	228.5	35.1	133.4	139.7	101.6	49.3	49.3	85.9	39.6	103.4	104.1		9.7	104.9	-	184.2	25.4	8	7/8	139.7	133.4	139.7
100	273.0	38.1	152.4	157.2	114.3	53.8	53.8	101.6	41.1	116.1	116.8		11.2	117.6	-	215.9	25.4	8	7/8	146.1	139.7	146.1
125	330.0	44.5	189.0	185.7	141.2	60.5	60.5	114.3	47.8	143.8	144.5		11.2	144.5	-	266.7	28.4	8	1	165.1	158.8	165.1
150	355.5	47.8	222.3	215.9	168.4	66.5	66.5	117.3	50.8	170.7	171.5		12.7	171.5	-	292.1	28.4	12	1	171.5	165.1	171.5
200	419.0	55.6	273.1	269.7	219.2	76.2	76.2	133.4	57.2	221.5	222.3		12.7	222.3	-	349.3	31.8	12	1 1/8	190.5	184.2	196.9
250	508.0	63.5	342.9	323.9	273.1	85.9	111.3	152.4	65.0	276.4	277.4		12.7	276.4	-	431.8	35.1	16	1 1/4	215.9	209.6	215.9
300	559.0	66.5	400.1	381.0	323.9	91.9	117.3	155.4	69.9	327.2	328.2		12.7	328.7	-	489.0	35.1	20	1 1/4	222.3	215.9	222.3
350	603.5	69.9	431.8	412.8	355.6	93.7	127.0	165.1	73.2	359.2	360.2		12.7	360.4	-	527.1	38.1	20	1 3/8	235.0	228.6	235.0
400	686.0	76.2	495.3	469.9	406.4	106.4	139.7	177.8	77.7	410.5	411.2		12.7	411.2	-	603.3	41.1	20	1 1/2	254.0	247.7	254.0
450	743.0	82.6	546.1	533.4	457.2	117.3	152.4	184.2	79.2	461.8	462.3		12.7	462.0	-	654.1	44.5	20	1 5/8	273.1	266.7	273.1
500	813.0	88.9	609.6	584.2	508.0	127.0	165.1	190.5	82.6	513.1	514.4		12.7	512.8	-	723.9	44.5	24	1 5/8	285.8	279.4	292.1
600	940.0	101.6	717.6	692.2	609.6	139.7	184.2	203.2	91.9	616.0	616.0		12.7	614.4	-	838.2	50.8	24	1 7/8	330.2	323.9	336.6

To be specified by purchaser.

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (C).
- Dimensions of sizes 1/2" through 3 1/2" are the same as for Class 400 Flanges.
- Depth of Socket (D) is covered by ANSI B 16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.

CLASS 900 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : inch

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter bore Threaded Flange Min.	DRILLING				LENGTH OF STUD BOLTS		
					Threaded Slip-on	Lapped	Welding Neck		Slip-on	Lapped	Welding Neck			Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint
1/2	4.75	0.88	1.50	0.84	1.25	1.25	2.38	0.88	0.88	0.90	0.12	0.93	3.25	0.88	4	3/4	4.25	4.00	4.25	
3/4	5.12	1.00	1.75	1.05	1.38	1.38	2.75	1.00	1.09	1.11	0.12	1.14	3.50	0.88	4	3/4	4.50	4.25	4.50	
1	5.88	1.12	2.06	1.32	1.62	1.62	2.88	1.12	1.36	1.38	0.12	1.41	4.00	1.00	4	7/8	5.00	4.75	5.00	
1 1/4	6.25	1.12	2.50	1.66	1.62	1.62	2.88	1.19	1.70	1.72	0.19	1.75	4.38	1.00	4	7/8	5.00	4.75	5.00	
1 1/2	7.00	1.25	2.75	1.90	1.75	1.75	3.25	1.25	1.95	1.97	0.25	1.99	4.88	1.12	4	1	5.50	5.25	5.50	
2	8.50	1.50	4.12	2.38	2.25	2.25	4.00	1.50	2.44	2.46	0.31	2.50	6.50	1.00	8	7/8	5.75	5.50	5.75	
2 1/2	9.62	1.62	4.88	2.88	2.50	2.50	4.12	1.88	2.94	2.97	0.31	3.00	7.50	1.12	8	1	6.25	6.00	6.25	
3	9.50	1.50	5.00	3.50	2.12	2.12	4.00	1.62	3.57	3.60	0.38	3.63	7.50	1.00	8	7/8	5.75	5.50	5.75	
4	11.50	1.75	6.25	4.50	2.75	2.75	4.50	1.88	4.57	4.60	0.44	4.63	9.25	1.25	8	1 1/8	6.75	6.50	6.75	
5	13.75	2.00	7.50	5.56	3.12	3.12	5.00	2.12	5.66	5.69	0.44	5.69	11.00	1.38	8	1 1/4	7.50	7.25	7.50	
6	15.00	2.19	9.25	6.63	3.38	3.38	5.50	2.25	6.72	6.75	0.50	6.75	12.50	1.25	12	1 1/8	7.50	7.25	7.75	
8	18.50	2.50	11.75	8.63	4.00	4.50	6.38	2.50	8.72	8.75	0.50	8.75	15.50	1.50	12	1 3/8	8.75	8.50	8.75	
10	21.50	2.75	14.50	10.75	4.25	5.00	7.25	2.81	10.88	10.92	0.50	10.88	18.50	1.50	16	1 3/8	9.25	9.00	9.25	
12	24.00	3.12	16.50	12.75	4.62	5.62	7.88	3.00	12.88	12.92	0.50	12.94	21.00	1.50	20	1 3/8	10.00	9.75	10.00	
14	25.25	3.38	17.75	14.00	5.12	6.12	8.38	3.25	14.14	14.18	0.50	14.19	22.00	1.62	20	1 1/2	10.75	10.50	11.00	
16	27.75	3.50	20.00	16.00	5.25	6.50	8.50	3.38	16.16	16.19	0.50	16.19	24.25	1.75	20	1 5/8	11.25	11.00	11.50	
18	31.00	4.00	22.25	18.00	6.00	7.50	9.00	3.50	18.18	18.20	0.50	18.19	27.00	2.00	20	1 7/8	12.75	12.50	13.25	
20	33.75	4.25	24.50	20.00	6.25	8.25	9.75	3.62	20.20	20.25	0.50	20.19	29.50	2.12	20	2	13.75	13.50	14.25	
24	41.00	5.50	29.50	24.00	8.00	10.50	11.50	4.00	24.25	24.25	0.50	24.19	35.50	2.62	20	2 1/2	17.25	17.00	18.00	

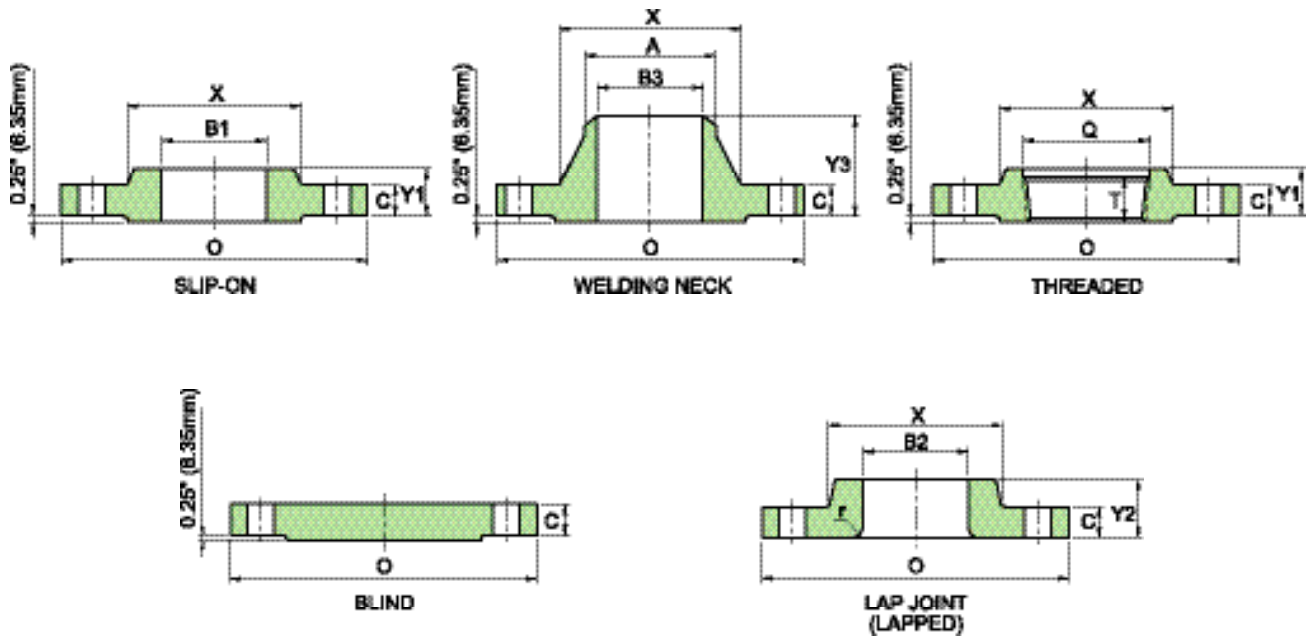
To be specified by purchaser.

NOTE :

- Class 900 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (C) and 'Length through Hub' (Y1), (Y3).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.

CLASS 900 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : mm

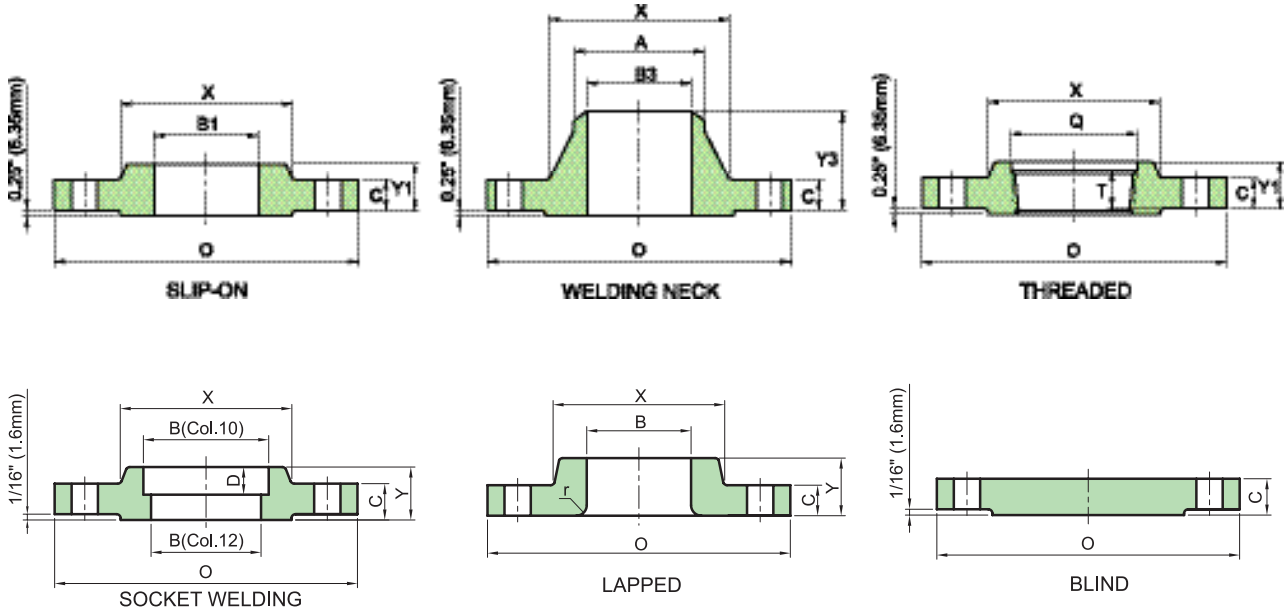
Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter bore Threaded Flange Min.	DRILLING				LENGTH OF STUD BOLTS		
					Threaded Slip-on	Lapped	Welding Neck		Slip-on	Lapped	Welding Neck			Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts (inch)	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint
15	120.7	22.4	38.1	21.3	31.8	31.8	60.5	22.4	22.4	22.9	3.0	23.6	82.6	22.4	4	3/4	108.0	101.6	108.0	
20	130.0	25.4	44.5	26.7	35.1	35.1	69.9	25.4	27.7	28.2	3.0	29.0	88.9	22.4	4	3/4	114.3	108.0	114.3	
25	149.4	28.4	52.3	33.5	41.1	41.1	73.2	28.4	34.5	35.1	3.0	35.8	101.6	25.4	4	7/8	127.0	120.7	127.0	
32	158.8	28.4	63.5	42.2	41.1	41.1	73.2	30.2	43.2	43.7	4.8	44.5	111.3	25.4	4	7/8	127.0	120.7	127.0	
40	177.8	31.8	69.9	48.3	44.5	44.5	82.6	31.8	49.5	50.0	6.4	50.5	124.0	28.4	4	1	139.7	133.4	139.7	
50	215.9	38.1	104.6	60.5	57.2	57.2	101.6	38.1	62.0	62.5	7.9	63.5	165.1	25.4	8	7/8	146.1	139.7	146.1	
65	244.3	41.1	124.0	73.2	63.5	63.5	104.6	47.8	74.7	75.4	7.9	76.2	190.5	28.4	8	1	158.8	152.4	158.8	
80	241.3	38.1	127.0	88.9	53.8	53.8	101.6	41.1	90.7	91.4	9.7	92.2	190.5	25.4	8	7/8	146.1	139.7	146.1	
100	292.1	44.5	158.8	114.3	69.9	69.9	114.3	47.8	116.1	116.8	11.2	117.6	235.0	31.8	8	1 1/8	171.5	165.1	171.5	
125	349.3	50.8	190.5	141.2	79.2	79.2	127.0	53.8	143.8	144.5	11.2	144.5	279.4	35.1	8	1 1/4	190.5	184.2	190.5	
150	381.0	55.6	235.0	168.4	85.9	85.9	139.7	57.2	170.7	171.5	12.7	171.5	317.5	31.8	12	1 1/8	190.5	184.2	196.9	
200	469.9	63.5	298.5	219.2	101.6	114.3	162.1	63.5	221.5	222.3	12.7	222.3	393.7	38.1	12	1 3/8	222.3	215.9	222.3	
250	546.1	69.9	368.3	273.1	108.0	127.0	184.2	71.4	276.4	277.4	12.7	276.4	469.9	38.1	16	1 3/8	235.0	228.6	235.0	
300	609.6	79.2	419.1	323.9	117.3	142.7	200.2	76.2	327.2	328.2	12.7	328.7	533.4	38.1	20	1 3/8	254.0	247.7	254.0	
350	641.4	85.9	450.9	355.6	130.0	155.4	212.9	82.6	359.2	360.2	12.7	360.4	558.8	41.1	20	1 1/2	273.1	266.7	279.4	
400	704.9	88.9	508.0	406.4	133.4	165.1	215.9	85.9	410.5	411.2	12.7	411.2	616.0	44.5	20	1 5/8	285.8	279.4	292.1	
450	787.4	101.6	565.2	457.2	152.4	190.5	228.6	88.9	461.8	462.3	12.7	462.0	685.8	50.8	20	1 7/8	323.9	317.5	336.6	
500	857.3	108.0	622.3	508.0	158.8	209.6	247.7	91.9	513.1	514.4	12.7	512.8	749.3	53.8	20	2	349.3	342.9	362.0	
600	1041.4	139.7	749.3	609.6	203.2	266.7	292.1	101.6	616.0	616.0	12.7	614.4	901.7	66.5	20	2 1/2	438.2	431.8	457.2	

To be specified by Purchaser.

- Dimensions of size 1/2 " through 2 1/2 " are the same as for class 1500 flanges.
- Socket Welding flange may be provided in NPS 1/2 " through 2 1/2 " using 1500 dimensions.

CLASS 1500 FLANGES

ANSI B 16.5 FORGED FLANGES



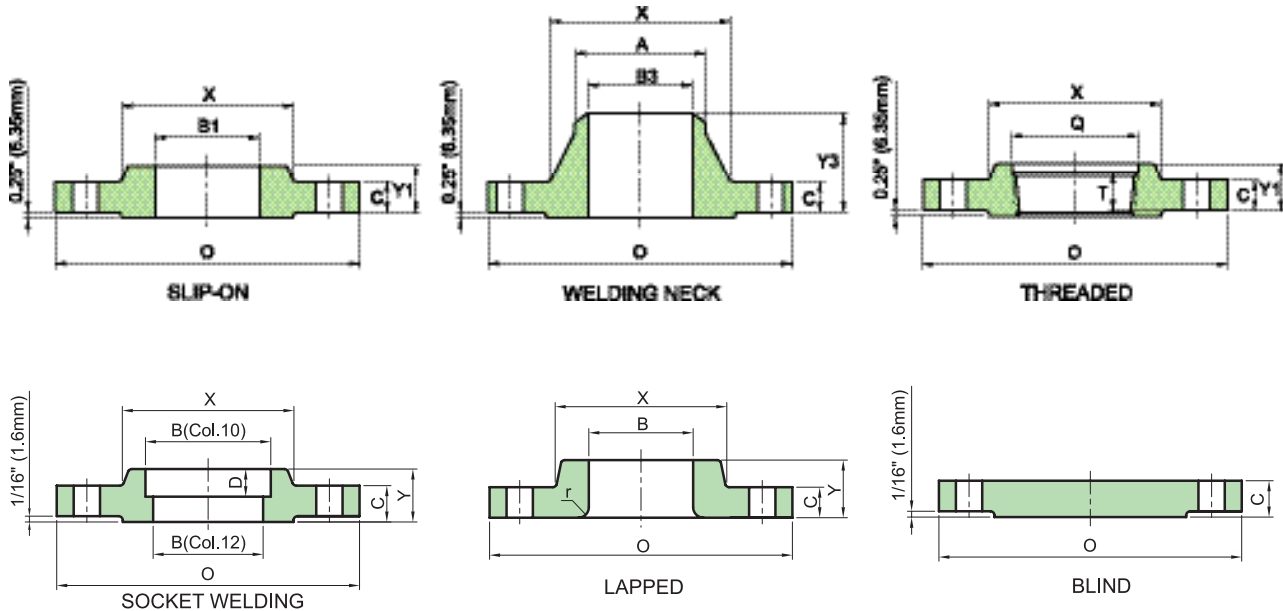
Unit : inch

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter bore Threaded Flange Min.	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS		
					Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding				Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint
	O	C	X	A	Y1	Y2	Y3	T	B1	B2	B3	r	Q	D							
1/2	4.75	0.88	1.50	0.84	1.25	1.25	2.38	0.88	0.88	0.90		0.12	0.93	0.38	3.25	0.88	4	3/4	4.25	4.00	4.25
3/4	5.12	1.00	1.75	1.05	1.38	1.38	2.75	1.00	1.09	1.11		0.12	1.14	0.44	3.50	0.88	4	3/4	4.50	4.25	4.50
1	5.88	1.12	2.06	1.32	1.62	1.62	2.88	1.12	1.36	1.38		0.12	1.41	0.50	4.00	1.00	4	7/8	5.00	4.75	5.00
1 1/4	6.25	1.12	2.50	1.66	1.62	1.62	2.88	1.19	1.70	1.72		0.19	1.75	0.56	4.38	1.00	4	7/8	5.00	4.75	5.00
1 1/2	7.00	1.25	2.75	1.90	1.75	1.75	3.25	1.25	1.95	1.97		0.25	1.99	0.62	4.88	1.12	4	1	5.50	5.25	5.50
2	8.50	1.50	4.12	2.38	2.25	2.25	4.00	1.50	2.44	2.46		0.31	2.50	0.69	6.50	1.00	8	7/8	5.75	5.50	5.75
2 1/2	9.62	1.62	4.88	2.88	2.50	2.50	4.12	1.88	2.94	2.97		0.31	3.00	0.75	7.50	1.12	8	1	6.25	6.00	6.25
3	10.50	1.88	5.25	3.50	-	2.88	4.62	-	-	3.60		0.38	-	-	8.00	1.25	8	1 1/8	7.00	6.75	7.00
4	12.25	2.12	6.38	4.50	-	3.56	4.88	-	-	4.60		0.44	-	-	9.50	1.38	8	1 1/4	7.75	7.50	7.75
5	14.75	2.88	7.75	5.56	-	4.12	6.12	-	-	5.69		0.44	-	-	11.50	1.62	8	1 1/2	9.75	9.50	9.75
6	15.50	3.25	9.00	6.63	-	4.69	6.75	-	-	6.75		0.50	-	-	12.50	1.50	12	1 3/8	10.25	10.00	10.50
8	19.00	3.62	11.50	8.63	-	5.62	8.38	-	-	8.75		0.50	-	-	15.50	1.75	12	1 5/8	11.50	11.25	12.75
10	23.00	4.25	14.50	10.75	-	7.00	10.00	-	-	10.92		0.50	-	-	19.00	2.00	12	1 7/8	13.25	13.00	13.50
12	26.50	4.88	17.75	12.75	-	8.62	11.12	-	-	12.92		0.50	-	-	22.50	2.12	16	2	14.75	14.50	15.25
14	29.50	5.25	19.50	14.00	-	9.50	11.75	-	-	14.18		0.50	-	-	25.00	2.38	16	2 1/4	16.00	15.75	16.75
16	32.50	5.75	21.75	16.00	-	10.25	12.25	-	-	16.19		0.50	-	-	27.75	2.62	16	2 1/2	17.50	17.25	18.50
18	36.00	6.38	23.50	18.00	-	10.88	12.88	-	-	18.20		0.50	-	-	30.50	2.88	16	2 3/4	19.50	19.25	20.75
20	38.75	7.00	25.25	20.00	-	11.50	14.00	-	-	20.25		0.50	-	-	32.75	3.12	16	3	21.25	21.00	22.25
24	46.00	8.00	30.00	24.00	-	13.00	16.00	-	-	24.25		0.50	-	-	39.00	3.62	16	3 1/2	24.25	24.00	25.50

NOTE : B3 = Bore size to be specified by customer

CLASS 1500 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : mm

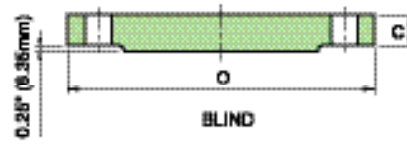
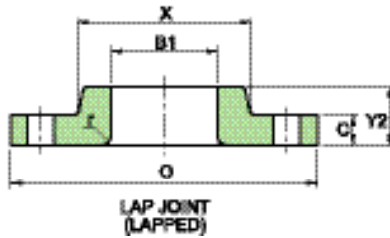
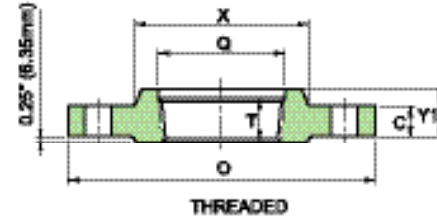
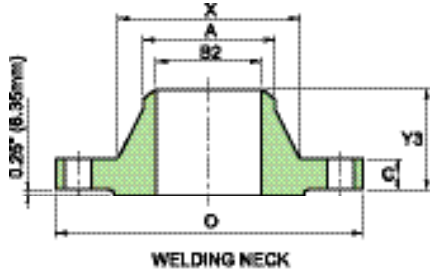
Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE			Corner Radius of Bore of Lapped Flange	Counter bore Threaded Flange Min.	Depth of Socket	DRILLING				LENGTH OF STUD BOLTS			
					Threaded Slip-on Socket Welding	Lapped	Welding Neck		Slip-on Socket Welding	Lapped	Welding Neck Socket Welding				r	Q	D	Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts (inch)	Raised Face (0.25 Inch)
	O	C	X	A	Y1	Y2	Y3	T	B1	B2	B3											
15	120.7	22.4	38.1	21.3	31.8	31.8	60.5	22.4	22.4	22.9		3.0	23.6	9.7	82.6	22.4	4	3/4	108.0	101.6	108.0	
20	130.0	25.4	44.5	26.7	35.1	35.1	69.9	25.4	27.7	28.2		3.0	29.0	11.2	88.9	22.4	4	3/4	114.3	108.0	114.3	
25	149.4	28.4	52.3	33.5	41.1	41.1	73.2	28.4	34.5	35.1		3.0	35.8	12.7	101.6	25.4	4	7/8	127.0	120.7	127.0	
32	158.8	28.4	63.5	42.2	41.1	41.1	73.2	30.2	43.2	43.7		4.8	44.5	14.2	111.3	25.4	4	7/8	127.0	120.7	127.0	
40	177.8	31.8	69.9	48.3	44.5	44.5	82.6	31.8	49.5	50.0		6.4	50.5	15.7	124.0	28.4	4	1	139.7	133.4	139.7	
50	215.9	38.1	104.6	60.5	57.2	57.2	101.6	38.1	62.0	62.5		7.9	63.5	17.5	165.1	25.4	8	7/8	146.1	139.7	146.1	
65	244.3	41.1	124.0	73.2	63.5	63.5	104.6	47.8	74.7	75.4		7.9	76.2	19.1	190.5	28.4	8	1	158.8	152.4	158.8	
80	266.7	47.8	133.4	88.9	-	73.2	117.3	-	-	91.4		9.7	-	-	203.2	31.8	8	1 1/8	177.8	171.5	177.8	
100	311.2	53.8	162.1	114.3	-	90.4	124.0	-	-	116.8		11.2	-	-	241.3	35.1	8	1 1/4	196.9	190.5	196.9	
125	374.7	73.2	196.9	141.2	-	104.6	155.4	-	-	144.5		11.2	-	-	292.1	41.1	8	1 1/2	247.7	241.3	247.7	
150	393.7	82.6	228.6	168.4	-	119.1	171.5	-	-	171.5		12.7	-	-	317.5	38.1	12	1 3/8	260.4	254.0	266.7	
200	482.6	91.9	292.1	219.2	-	142.7	212.9	-	-	222.3		12.7	-	-	393.7	44.5	12	1 5/8	292.1	285.8	323.9	
250	584.2	108.0	368.3	273.1	-	177.8	254.0	-	-	277.4		12.7	-	-	482.6	50.8	12	1 7/8	336.6	330.2	342.9	
300	673.1	124.0	450.9	323.9	-	218.9	282.4	-	-	328.2		12.7	-	-	571.5	53.8	16	2	374.7	368.3	387.4	
350	749.3	133.4	495.3	355.6	-	241.3	298.5	-	-	360.2		12.7	-	-	635.0	60.5	16	2 1/4	406.4	400.1	425.5	
400	825.5	146.1	552.5	406.4	-	260.4	311.2	-	-	411.2		12.7	-	-	704.9	66.5	16	2 1/2	444.5	438.2	469.9	
450	914.4	162.1	596.9	457.2	-	276.4	327.2	-	-	462.3		12.7	-	-	774.7	73.2	16	2 3/4	495.3	489.0	527.1	
500	984.3	177.8	641.4	508.0	-	292.1	355.6	-	-	514.4		12.7	-	-	831.9	79.2	16	3	539.8	533.4	565.2	
600	1168.4	203.2	762.0	609.6	-	330.2	406.4	-	-	616.0		12.7	-	-	990.6	91.9	16	3 1/2	616.0	609.6	647.7	

To be specified by Purchaser.

NOTE : B = Bore size to be specified by customer

CLASS 2500 FLANGES

ANSI B 16.5 FORGED FLANGES



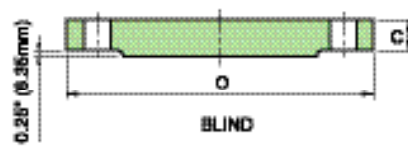
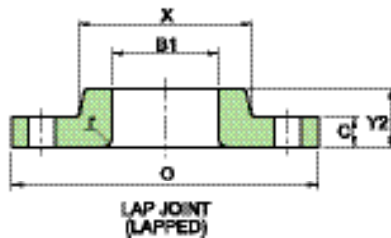
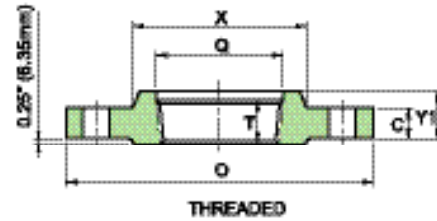
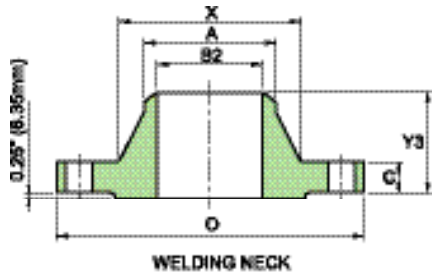
Unit : inch

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE		Corner Radius of Bore of Lapped Flange	Counter bore Threaded Flange Min.	DRILLING				LENGTH OF STUD BOLTS		
					Threaded	Lapped	Welding Neck		Lapped	Welding Neck			Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint
	O	C	X	A	Y1	Y2	Y3	T	B1	B2	r	Q							
1/2	5.25	1.19	1.69	0.84	1.56	1.56	2.88	1.12	0.90	To be specified by Purchaser.	0.12	0.93	3.50	0.88	4	3/4	4.75	4.50	4.75
3/4	5.50	1.25	2.00	1.05	1.69	1.69	3.12	1.25	1.11		0.12	1.14	3.75	0.88	4	3/4	5.00	4.75	5.00
1	6.25	1.38	2.25	1.32	1.88	1.88	3.50	1.38	1.38		0.12	1.41	4.25	1.00	4	7/8	5.50	5.25	5.50
1 1/4	7.25	1.50	2.88	1.66	2.06	2.06	3.75	1.50	1.72		0.19	1.75	5.12	1.12	4	1	6.00	5.75	6.00
1 1/2	8.00	1.75	3.12	1.90	2.38	2.38	4.38	1.75	1.97		0.25	1.99	5.75	1.25	4	1 1/8	6.75	6.50	6.75
2	9.25	2.00	3.75	2.38	2.75	2.75	5.00	2.00	2.46		0.31	2.50	6.75	1.12	8	1	7.00	6.75	7.00
2 1/2	10.50	2.25	4.50	2.88	3.12	3.12	5.62	2.25	2.97		0.31	3.00	7.75	1.25	8	1 1/8	7.75	7.50	8.00
3	12.00	2.62	5.25	3.50	-	3.62	6.62	-	3.60		0.38	-	9.00	1.38	8	1 1/4	8.75	8.50	9.00
4	14.00	3.00	6.50	4.50	-	4.25	7.50	-	4.60		0.44	-	10.75	1.62	8	1 1/2	10.00	9.75	10.25
5	16.50	3.62	8.00	5.56	-	5.12	9.00	-	5.69		0.44	-	12.75	1.88	8	1 3/4	11.75	11.50	12.25
6	19.00	4.25	9.25	6.63	-	6.00	10.75	-	6.75		0.50	-	14.50	2.12	8	2	13.50	13.25	14.00
8	21.75	5.00	12.00	8.63	-	7.00	12.50	-	8.75		0.50	-	17.25	2.12	12	2	15.00	14.75	15.50
10	26.50	6.50	14.75	10.75	-	9.00	16.50	-	10.92	0.50	-	21.25	2.62	12	2 1/2	19.25	19.00	20.00	
12	30.00	7.25	17.38	12.75	-	10.00	18.25	-	12.92	0.50	-	24.38	2.88	12	2 3/4	21.25	21.00	22.00	

NOTE : B = Bore size to be specified by customer

CLASS 2500 FLANGES

ANSI B 16.5 FORGED FLANGES



Unit : mm

Nominal Pipe Size	Outside Diam. of Flanges	Thk. of Flange Min.	Diam. of Hub	Hub Diam. Chamfer of W.N	LENGTH THROUGH HUB			Thread Length	BORE		Corner Radius of Bore of Lapped Flange	Counter bore Threaded Flange Min.	DRILLING				LENGTH OF STUD BOLTS			
					Threaded	Lapped	Welding Neck		Lapped	Welding Neck			Diam. of Bolt Circle	Diam. of Bolt Holes	Number of Bolts	Diam. of Bolts (inch)	Raised Face (0.25 Inch)	Male & Female or Tongue & Groove	Ring Joint	
	O	C	X	A	Y1	Y2	Y3	T	B1	B2	r	Q								
15	133.4	30.2	42.9	21.3	39.6	39.6	73.2	28.4	22.9		3.0	23.6	88.9	22.4	4	3/4	120.7	114.3	120.7	
20	139.7	31.8	50.8	26.7	42.9	42.9	79.2	31.8	28.2		3.0	29.0	95.3	22.4	4	3/4	127.0	120.7	127.0	
25	158.8	35.1	57.2	33.5	47.8	47.8	88.9	35.1	35.1		3.0	35.8	108.0	25.4	4	7/8	139.7	133.4	139.7	
32	184.2	38.1	73.2	42.2	52.3	52.3	95.3	38.1	43.7		4.8	44.5	130.0	28.4	4	1	152.4	146.1	152.4	
40	203.2	44.5	79.2	48.3	60.5	60.5	111.3	44.5	50.0		6.4	50.5	146.1	31.8	4	1 1/8	171.5	165.1	171.5	
50	235.0	50.8	95.3	60.5	69.9	69.9	127.0	50.8	62.5		7.9	63.5	171.5	28.4	8	1	177.8	171.5	177.8	
65	266.7	57.2	114.3	73.2	79.2	79.2	142.7	57.2	75.4		7.9	76.2	196.9	31.8	8	1 1/8	196.9	190.5	203.2	
80	304.8	66.5	133.4	88.9	-	91.9	168.1	-	91.4		9.7	-	228.6	35.1	8	1 1/4	222.3	215.9	228.6	
100	355.6	76.2	165.1	114.3	-	108.0	190.5	-	116.8		11.2	-	273.1	41.1	8	1 1/2	254.0	247.7	260.4	
125	419.1	91.9	203.2	141.2	-	130.0	228.6	-	144.5		11.2	-	323.9	47.8	8	1 3/4	298.5	292.1	311.2	
150	482.6	108.0	235.0	168.4	-	152.4	273.1	-	171.5		12.7	-	368.3	53.8	8	2	342.9	336.6	355.6	
200	552.5	127.0	304.8	219.2	-	177.8	317.5	-	222.3		12.7	-	438.2	53.8	12	2	381.0	374.7	393.7	
250	673.1	165.1	374.7	273.1	-	228.6	419.1	-	277.4		12.7	-	539.8	66.5	12	2 1/2	489.0	482.6	508.0	
300	762.0	184.2	441.5	323.9	-	254.0	463.6	-	328.2		12.7	-	619.3	73.2	12	2 3/4	539.8	533.4	558.8	

NOTE : B = Bore size to be specified by customer

FLANGE ANSI B 16.5

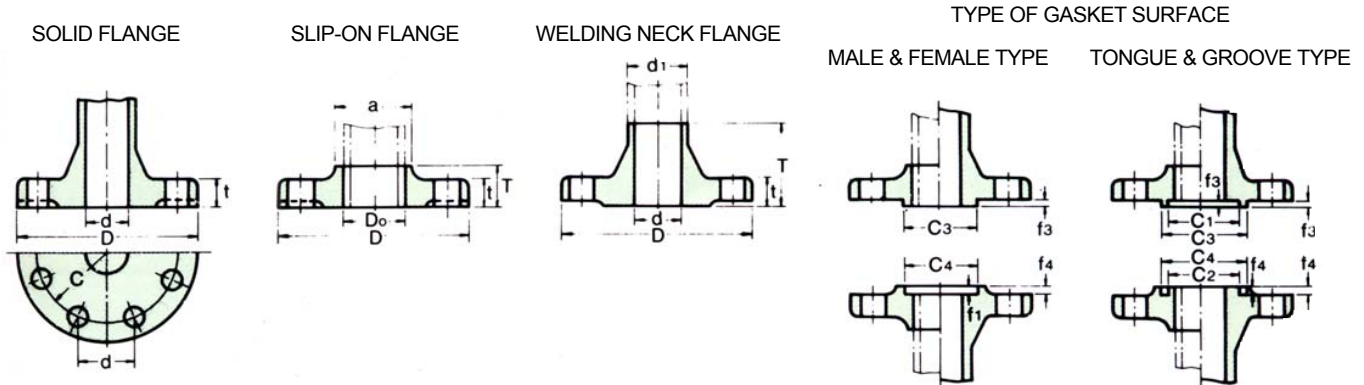
SIZE	CLASS 1500									
	WELDING-NECK		SLIP-ON		LAP JOINT		THREADED		BLIND	
	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb
1/2	2.1	4.6	1.8	4.0	1.8	4.0	1.8	4.0	1.9	4.2
3/4	2.7	5.9	2.4	5.3	2.3	5.0	2.3	5.0	2.7	6.0
1	3.9	8.6	3.6	7.9	3.6	7.9	3.6	7.9	3.7	8.1
1 1/4	4.5	9.9	4.1	9.0	4.1	9.0	4.1	9.0	4.3	9.5
1 1/2	6.2	13.7	5.4	12.0	5.4	12.0	5.4	12.0	5.9	13.0
2	11.3	24.9	10.5	23.1	10.5	23.1	10.5	23.1	11.3	24.9
2 1/2	16.3	36.0	15.8	34.8	15.8	34.8	15.8	34.8	16.0	35.2
3	21.0	46.3	21.5	43.0	18.5	40.8	18.5	40.8	19.5	43.0
3 1/2	-	-	-	-	-	-	-	-	-	-
4	31.8	70.1	31.0	68.3	29.0	64.0	29.0	64.0	33.0	72.8
5	59.0	129.8	58.8	130.0	54.0	119.0	53.0	117.0	60.0	132.0
6	72.0	158.0	74.0	163.0	62.0	137.0	61.0	134.0	75.0	165.0
8	124.0	273.0	112.0	247.0	106.0	233.0	105.0	231.0	125.0	275.0
10	207.0	456.0	184.0	406.0	173.0	381.0	172.0	379.0	215.0	474.0
12	306.0	674.0	264.0	581.0	262.0	577.0	264.0	582.0	316.0	697.0
14	416.0	917.0	-	-	-	-	-	-	-	-
16	567.0	1250.0	-	-	-	-	-	-	-	-
18	736.0	1623.0	-	-	-	-	-	-	-	-
20	929.0	2048.0	-	-	-	-	-	-	-	-
24	1504.0	3316.0	-	-	-	-	-	-	-	-

SIZE	CLASS 2500							
	WELDING-NECK		LAP JOINT		THREADED		BLIND	
	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb
1/2	3.2	7.0	3.0	6.6	3.0	6.6	3.0	7.0
3/4	3.6	8.0	4.0	8.8	4.0	8.8	4.5	10.0
1	5.4	12.0	5.0	11.0	5.0	11.0	5.0	12.0
1 1/4	7.8	17.2	8.0	17.6	8.0	17.6	8.0	18.0
1 1/2	11.5	25.4	11.0	25.0	11.0	25.0	11.0	25.0
2	19.0	42.0	17.0	38.0	17.0	38.0	17.0	38.0
2 1/2	24.0	52.0	25.0	55.0	25.0	55.0	25.0	55.0
3	42.6	94.0	38.0	83.0	38.0	83.0	39.0	86.0
3 1/2	-	-	-	-	-	-	-	-
4	64.0	141.0	58.0	127.0	58.0	127.0	60.0	133.0
5	111.0	244.0	95.0	210.0	95.0	210.0	101.0	223.0
6	171.0	378.0	146.0	323.0	146.0	323.0	156.0	345.0
8	261.0	576.0	220.0	485.0	220.0	485.0	242.0	533.0
10	485.0	1068.0	420.0	925.0	420.0	925.0	465.0	1023.0
12	698.0	1539.0	590.0	1300.0	590.0	1300.0	665.0	1463.0

SIZE	SOCKET - WELDING					
	CLASSES					
	150		300		600	
	Kg	Lb	Kg	Lb	Kg	Lb
1/2	0.4	0.9	0.7	1.5	1.0	2.2
3/4	0.7	1.5	1.2	2.6	1.6	3.5
1	0.9	2.0	1.4	3.1	1.8	4.0
1 1/4	1.2	2.6	1.9	4.2	2.6	5.7
1 1/2	1.5	3.3	2.8	6.2	3.3	7.7
2	2.3	5.1	3.3	7.3	3.9	8.6
2 1/2	3.7	8.1	4.6	10.1	6.0	13.2
3	4.2	9.2	6.3	13.9	7.4	16.3
3 1/2	5.2	11.4	7.8	17.2	9.5	20.9
4	5.9	13.0	10.0	22.0	-	-
5	7.0	15.4	-	-	-	-
6	8.4	18.5	-	-	-	-
8	12.6	27.7	-	-	-	-
10	18.0	39.6	-	-	-	-
12	29.5	65.0	-	-	-	-
14	38.0	84.0	-	-	-	-
16	42.0	93.0	-	-	-	-
18	54.0	120.0	-	-	-	-
20	70.0	155.0	-	-	-	-
24	94.0	207.0	-	-	-	-

TOLERANCE

ANSI B 16.5 FORGED FLANGES



THREADED, SOCKET-WELDING, SLIP-ON, LAP JOINT AND BLIND.

Outside Diameter	When O.D. is 24" or less	$\pm 1/16"$ (1.6mm)*	
	When O.D. is Over 24"	$\pm 1/8"$ (3.2mm)*	
Inside Diameter	Threaded	Within limits on boring gague	
	Socket-Welding, Slip-on and Lap joint	10" & Smaller $+1/32"$ (0.8mm), $-0"$ 12" & Larger $+1/16"$ (1.6mm), $-0"$	
Outside Diameter of Hub	5" and Smaller	$+3/32"$ (2.4mm) $-1/32"$ (0.8mm)	
	6" and Larger	$+5/32"$ (4.0mm) $-1/32"$ (0.8mm)	
Diameter of Contact Face	1/16" Raised Face	$\pm 1/32"$ (0.8mm)	
	1/4" Raised Face Tongue & Groove Male, Female	$\pm 1/64"$ (0.4mm)	
Diameter of Counterbore	Same as for Inside Daimeter		
Drilling	Bolt Circle	$\pm 1/16"$ (1.6mm)	
	Bolt Hole Spacing	$\pm 1/32"$ (0.8mm)	
	Eccentricity of Bolt Circle with Respect to Facing	2 1/2" & Smaller	$1/32"$ (0.8mm) Max.
		3" & Larger	$1/16"$ (1.6mm) Max.
	Eccentricity of Bolt Circle with Respect to Bore	$1/32"$ (0.8mm) Max.*	
Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) Max.*		
Thickness	18" and Smaller	$+1/8"$ (3.2mm), $-0"$	
	20" and Larger	$+3/16"$ (4.8mm), $-0"$	
Length Thru Hub	10" and Smaller	$\pm 1/16"$ (1.6mm)	
	12" and Larger	$\pm 1/8"$ (3.2mm)	

NOTE : * This tolerance is not covered in ANSI B16.5, but maker's option.

WELDING NECK

Outside Diameter	When O.D. is 24" or less	$\pm 1/16"$ (1.6mm)*	
	When O.D. is Over 24"	$\pm 1/8"$ (3.2mm)*	
Inside Diameter	10" and Smaller	$\pm 1/32"$ (0.8mm)	
	12" thru 18"	$\pm 1/16"$ (1.6mm)	
	20" and Larger	$+1/8"$ (3.2mm) $-1/16"$ (1.6mm)	
Diameter of Contact Face	1/16" Raised Face	$\pm 1/32"$ (0.8mm)	
	1/4" Raised Face Tongue & Groove Male, Female	$\pm 1/64"$ (0.4mm)	
Diameter of Hub at Base	When Hub Base is 24" or Smaller	$\pm 1/16"$ (1.6mm)	
	When Hub Base is Over 24"	$\pm 1/8"$ (3.2mm)	
Diameter of Hub at Point of Welding	5" and Smaller	$+3/32"$ (2.4mm) $-1/32"$ (0.8mm)	
	6" and Larger	$+5/32"$ (4.0mm) $-1/32"$ (0.8mm)	
Drilling	Bolt Circle	$\pm 1/16"$ (1.6mm)	
	Bolt Hole Spacing	$\pm 1/32"$ (0.8mm)	
	Eccentricity of Bolt Circle with Respect to Facing	2 1/2" & Smaller	$1/32"$ (0.8mm) Max.
		3" & Larger	$1/16"$ (1.6mm) Max.
	Eccentricity of Bolt Circle with Respect to Bore	$1/32"$ (0.8mm) Max.*	
Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) Max.*		
Thickness	18" and Smaller	$+1/8"$ (3.2mm), $-0"$	
	20" and Larger	$+3/16"$ (4.8mm), $-0"$	
Length Thru Hub	10" and Smaller	$\pm 1/16"$ (1.6mm)	
	12" and Larger	$\pm 1/8"$ (3.2mm)	

NOTE : * This tolerance is not covered in ANSI B16.5, but maker's option.

WELDED AND SEAMLESS PIPE CARBON AND ALLOY STEELS

ANSI B 36.10

Dimensions in inches

Nominal Pipe Size	Outside Diam.	Wall I.D.	NOMINAL WALL THICKNESS AND INSIDE DAIMETER												
			Schedule 10	Schedule 20	Schedule 30	STD	Schedule 40	Schedule 60	XS	Schedule 80	Schedule 100	Schedule 120	Schedule 140	Schedule 160	XXS
1/8	0.405	Wall	-	-	-	0.068	0.068	-	0.095	0.095	-	-	-	-	-
		I.D.	-	-	-	0.269	0.269	-	0.215	0.215	-	-	-	-	-
1/4	0.540	Wall	-	-	-	0.088	0.088	-	0.119	0.119	-	-	-	-	-
		I.D.	-	-	-	0.364	0.364	-	0.302	0.302	-	-	-	-	-
3/8	0.675	Wall	-	-	-	0.091	0.091	-	0.126	0.126	-	-	-	-	-
		I.D.	-	-	-	0.493	0.493	-	0.423	0.423	-	-	-	-	-
1/2	0.840	Wall	-	-	-	0.109	0.109	-	0.147	0.147	-	-	-	0.188	0.294
		I.D.	0.674	-	-	0.622	0.622	-	0.546	0.546	-	-	-	0.466	0.252
3/4	1.050	Wall	-	-	-	0.113	0.113	-	0.154	0.154	-	-	-	0.219	0.308
		I.D.	0.884	-	-	0.824	0.824	-	0.742	0.742	-	-	-	0.612	0.434
1	1.315	Wall	-	-	-	0.133	0.133	-	0.179	0.179	-	-	-	0.250	0.358
		I.D.	1.097	-	-	1.049	1.049	-	0.957	0.957	-	-	-	0.815	0.599
1 1/4	1.660	Wall	-	-	-	0.140	0.140	-	0.191	0.191	-	-	-	0.250	0.382
		I.D.	1.442	-	-	1.380	1.380	-	1.278	1.278	-	-	-	1.160	0.896
1 1/2	1.900	Wall	-	-	-	0.145	0.145	-	0.200	0.200	-	-	-	0.281	0.400
		I.D.	1.682	-	-	1.610	1.610	-	1.500	1.500	-	-	-	1.338	1.100
2	2.375	Wall	-	-	-	0.154	0.154	-	0.218	0.218	-	-	-	0.344	0.436
		I.D.	2.157	-	-	2.067	2.067	-	1.939	1.939	-	-	-	1.687	1.503
2 1/2	2.875	Wall	-	-	-	0.203	0.203	-	0.276	0.276	-	-	-	0.375	0.552
		I.D.	2.635	-	-	2.469	2.469	-	2.323	2.323	-	-	-	2.125	1.771
3	3.500	Wall	-	-	-	0.216	0.216	-	0.300	0.300	-	-	-	0.438	0.600
		I.D.	3.260	-	-	3.068	3.068	-	2.900	2.900	-	-	-	2.624	2.300
3 1/2	4.000	Wall	-	-	-	0.226	0.226	-	0.318	0.318	-	-	-	-	-
		I.D.	3.760	-	-	3.548	3.548	-	3.364	3.364	-	-	-	-	2.728
4	4.500	Wall	-	-	-	0.237	0.237	-	0.337	0.337	-	0.438	-	0.531	0.674
		I.D.	4.260	-	-	4.026	4.026	-	3.826	3.826	-	3.624	-	3.438	3.152
5	5.563	Wall	-	-	-	0.258	0.258	-	0.375	0.375	-	0.500	-	0.625	0.750
		I.D.	5.295	-	-	5.047	5.047	-	4.813	4.813	-	4.563	-	4.313	4.063
6	6.625	Wall	-	-	-	0.280	0.280	-	0.432	0.432	-	0.562	-	0.719	0.864
		I.D.	6.357	-	-	6.065	6.065	-	5.761	5.761	-	5.501	-	5.187	4.897
8	8.625	Wall	-	0.250	0.277	0.322	0.322	0.406	0.500	0.500	0.594	0.719	0.812	0.906	0.875
		I.D.	8.329	8.125	8.071	7.981	7.981	7.813	7.625	7.625	7.437	7.187	7.001	6.813	6.875
10	10.750	Wall	-	0.250	0.307	0.365	0.365	0.500	0.500	0.594	0.719	0.844	1.000	1.125	1.000
		I.D.	10.420	10.250	10.136	10.020	10.020	9.750	9.750	9.562	9.312	9.062	8.750	8.500	-
12	12.750	Wall	-	0.250	0.330	0.375	0.406	0.562	0.500	0.688	0.844	1.000	1.125	1.312	1.000
		I.D.	12.390	12.250	12.090	12.000	11.938	11.626	11.750	11.374	11.062	10.750	10.500	10.126	-
14	14.000	Wall	0.250	0.312	0.375	0.375	0.438	0.594	0.500	0.750	0.938	1.094	1.250	1.406	-
		I.D.	13.500	13.376	13.250	13.250	13.124	12.812	13.000	12.500	12.124	11.812	11.500	11.188	-
16	16.000	Wall	0.250	0.312	0.375	0.375	0.500	0.656	0.500	0.844	1.031	1.219	1.438	1.594	-
		I.D.	15.500	15.376	15.250	15.250	15.000	14.688	15.000	14.312	13.938	13.562	13.124	12.812	-
18	18.000	Wall	0.250	0.312	0.438	0.375	0.562	0.750	0.500	0.938	1.156	1.375	1.562	1.781	-
		I.D.	17.500	17.376	17.124	17.250	16.876	16.500	17.000	16.124	15.250	15.250	14.876	14.438	-
20	20.000	Wall	0.250	0.375	0.500	0.375	0.594	0.812	0.500	1.031	1.281	1.500	1.750	1.969	-
		I.D.	19.500	19.250	19.000	19.250	18.812	18.376	19.000	17.938	17.438	17.000	16.500	16.062	-
24	24.000	Wall	0.250	0.375	0.562	0.375	0.688	0.969	0.500	1.218	1.531	1.812	2.062	2.344	-
		I.D.	23.500	23.250	22.876	23.250	22.624	22.062	23.000	21.562	20.938	20.376	19.876	19.312	-

Not included in B36.10

The wall thickness shown represent nominal or average wall dimensions which are subject to a - 12 1/2% mill tolerance.

Note that schedule 40 in, sizes 12" and larger and that schedule 80 in, sizes 10" and larger do not agree with schedule 40S and 80S of ANSI B36.19 nor with standard weight and extra strong respectively

Rev. 2.0 / 2012.05.11



WELDED AND SEAMLESS PIPE STAINLESS STEELS

ANSI B 36.19

Dimensions in inches

Nominal Pipe Size	Outside Diameter	Wall Thickness Inside Diameter	NOMINAL WALL THICKNESS AND INSIDE DAIMETER		
			Schedule 5S*	Schedule 10S*	Schedule 40S**
1/8	0.405	Wall	-	0.049	0.068
		I.D.	-	0.307	0.269
1/4	0.540	Wall	-	0.065	0.088
		I.D.	-	0.410	0.364
3/8	0.675	Wall	-	0.065	0.091
		I.D.	-	0.545	0.493
1/2	0.840	Wall	0.065	0.083	0.109
		I.D.	0.710	0.674	0.622
3/4	1.050	Wall	0.065	0.083	0.113
		I.D.	0.920	0.884	0.824
1	1.315	Wall	0.065	0.109	0.133
		I.D.	1.185	1.097	1.049
1 1/4	1.660	Wall	0.065	0.109	0.140
		I.D.	1.530	1.442	1.380
1 1/2	1.900	Wall	0.065	0.109	0.145
		I.D.	1.770	1.682	1.610
2	2.375	Wall	0.065	0.109	0.154
		I.D.	2.245	2.157	2.067
2 1/2	2.875	Wall	0.083	0.120	0.203
		I.D.	2.709	2.635	2.469
3	3.500	Wall	0.083	0.120	0.216
		I.D.	3.334	3.260	3.068
3 1/2	4.000	Wall	0.083	0.120	0.226
		I.D.	3.834	3.760	3.548
4	4.500	Wall	0.083	0.120	0.237
		I.D.	4.334	4.260	4.026
5	5.563	Wall	0.109	0.134	0.258
		I.D.	5.345	5.295	5.047
6	6.625	Wall	0.109	0.134	0.280
		I.D.	6.047	6.357	6.065
8	8.625	Wall	0.109	0.148	0.322
		I.D.	8.407	8.329	7.981
10	10.750	Wall	0.134	0.165	0.365
		I.D.	10.482	10.420	10.020
12	12.750	Wall	0.156	0.180	0.375**
		I.D.	12.438	12.390	12.000**
14 ‡	14.000	Wall	0.156	0.188	-
		I.D.	13.688	13.624	-
16 ‡	16.000	Wall	0.165	0.188	-
		I.D.	15.670	15.624	-
18 ‡	18.000	Wall	0.165	0.188	-
		I.D.	17.670	17.624	-
20 ‡	20.000	Wall	0.188	0.218	-
		I.D.	19.624	19.564	-
24 ‡	24.000	Wall	0.218	0.250	-
		I.D.	23.564	23.500	-

The wall thickness shown represent nominal or average wall dimensions which are subject to a - 12 1/2% mill tolerance.

‡ Size 14" through 30" are not at publication date covered in B36.19, and dimensions listed are those commonly used in the industry.

* Schedule 5S and 10S wall thickness do not permit threading in accordance with ANSI B2.1.

** Note that schedule 40S and schedule 80S in these sizes do not agree with schedule 40 and schedule 80 of ANSI B36.10, and that they are identical to standard weight and extra strong respectively of ANSI B36.10.

MATERIAL SPECIFICATIONS

ANSI B16.5 (ASTM STANDARD)

ASTM	Grade	Classifi- Cation	CHEMICAL COMPOSITION								MECHANICAL PROPERTIES				
			C %	Mn %	P Max %	S Max %	Si %	Ni %	Cr %	Mo %	T.S. Min psi (kg/mm ²)	Y.S. Min psi (kg/mm ²)	EL. Min. %	Red Min. %	HB
A-105*		Carbon steel	MAX 0.35	0.60 ~ 1.05	0.040	0.050	MAX 0.35	MAX 0.40	MAX 0.30	MAX 0.12	70,000 (49.2)	36,000 (25.3)	22	30	MAX 187
A-181	60	Carbon steel	MAX 0.35	MAX 0.90	0.050	0.050	MAX 0.35	-	-	-	60,000 (42.2)	36,000 (21.1)	22	35	-
A-181	70	Carbon steel	MAX 0.35	MAX 0.90	0.050	0.050	MAX 0.35	-	-	-	70,000 (49.2)	36,000 (25.3)	18	24	-
A-182	F1	½ Mo	MAX 0.28	0.6 ~ 0.90	0.045	0.045	0.15 ~ 0.35	-	-	0.44 ~ 0.65	70,000 (49.2)	40,000 (28.1)	20	30	143 ~ 192
A-182	F5	5cr - ½ Mo	MAX 0.15	0.30 ~ 0.60	0.030	0.030	MAX 0.50	MAX 0.50	4.0 ~ 6.0	0.44 ~ 0.65	70,000 (49.2)	40,000 (28.1)	20	35	143 ~ 217
A-182	F5a	5cr - ½ Mo	MAX 0.25	MAX 0.6	0.040	0.030	MAX 0.50	MAX 0.50	4.0 ~ 6.0	0.44 ~ 0.65	90,000 (63.3)	65,000 (45.7)	22	50	187 ~ 248
A-182	F11-1	1 ¼Cr - ½ Mo	0.05 ~ 0.15	0.30 ~ 0.60	0.030	0.030	0.50 ~ 1.00	-	1.00 ~ 1.50	0.44 ~ 0.65	60,000 (42.2)	30,000 (21.1)	20	45	121 ~ 174
A-182	F11-2	1 ¼Cr - ½ Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.50 ~ 1.00	-	1.00 ~ 1.50	0.44 ~ 0.65	70,000 (49.2)	40,000 (28.1)	20	30	143 ~ 207
A-182	F11-3	1 ¼Cr - ½ Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.50 ~ 1.00	-	1.00 ~ 1.50	0.44 ~ 0.65	75,000 (52.7)	45,000 (31.6)	20	30	156 ~ 207
A-182	F12-1	1Cr - ½ Mo	0.05 ~ 0.15	0.30 ~ 0.60	0.045	0.045	MAX 0.50	-	0.80 ~ 1.25	0.44 ~ 0.65	60,000 (42.2)	30,000 (21.1)	20	45	121 ~ 174
A-182	F12-2	1Cr - ½ Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.10 ~ 0.60	-	0.80 ~ 1.25	0.44 ~ 0.65	70,000 (49.2)	40,000 (28.1)	20	30	143 ~ 207
A-182	F11	1 ¼Cr - ½ Mo	0.10 ~ 0.20	0.30 ~ 0.60	0.040	0.040	0.5 ~ 1.00	-	1.00 ~ 1.50	0.44 ~ 0.65	70,000 (49.2)	40,000 (28.1)	20	30	143 ~ 207
A-182	F12	1Cr - ½ Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.1 ~ 0.6	-	0.80 ~ 1.25	0.44 ~ 0.65	70,000 (49.2)	40,000 (28.1)	20	30	143 ~ 207
A-182	F22	2 ¼Cr - 1 Mo	MAX 0.15	0.30 ~ 0.60	0.040	0.040	MAX 0.50	-	2.00 ~ 2.50	0.87 ~ 1.13	75,000 (52.7)	45,000 (31.6)	20	30	156 ~ 207
A-182	F304	18Cr - 8 Ni	MAX 0.08	MAX 2.00	0.040	0.030	MAX 1.00	8.00 ~ 11.00	18.00 ~ 20.00	-	75,000 (52.7)	30,000 (21.1)	30	50	-
A-182	F304L	18Cr - 8 Ni Low	MAX 0.035	MAX 2.00	0.040	0.030	MAX 1.00	8.00 ~ 13.00	18.00 ~ 20.00	-	70,000 (49.2)	25,000 (17.6)	30	50	-
A-182	F316	18Cr - 8 Ni Mo	MAX 0.08	MAX 2.00	0.040	0.030	MAX 1.00	8.00 ~ 14.00	16.00 ~ 18.00	2.00 ~ 3.00	75,000 (52.7)	30,000 (21.7)	30	50	-
A-182	F316L	18Cr - 8 Ni Mo - Low	MAX 0.035	MAX 2.00	0.040	0.030	MAX 1.00	10.00 ~ 15.00	16.00 ~ 18.00	2.00 ~ 3.00	65,000 (45.7)	25,000 (17.6)	30	50	-
A-182	F321	18Cr - 8 Ni Ti	MAX 0.08	MAX 2.00	0.030	0.030	MAX 1.00	9.00 ~ 12.00	Min 17.00	-	75,000 (52.7)	30,000 (21.1)	30	50	-
A-182	F347	18Cr - 8 Ni Cb	MAX 0.08	MAX 2.00	0.030	0.030	MAX 1.00	9.00 ~ 13.00	17.00 ~ 20.00	-	75,000 (52.7)	30,000 (21.1)	30	50	-
A-350*	LF1	Carbon Steel	MAX 0.30	0.75 ~ 1.05	0.035	0.040	0.15 ~ 0.30	MAX 0.40	MAX 0.30	MAX 0.12	60,000 ~ 85,000 (42.2~59.7)	30,000 (21.1)	25	38	-
A-350*	LF2	Carbon Steel	MAX 0.30	MAX 1.35	0.035	0.040	0.15 ~ 0.30	MAX 0.40	MAX 0.30	MAX 0.12	70,000 ~ 95,000 (49.2~66.8)	36,000 (25.3)	22	30	-
A-350*	LF3	3 ½ Ni	MAX 0.20	MAX 0.90	0.035	0.040	0.20 ~ 0.35	3.25 ~ 3.75	MAX 0.30	MAX 0.12	70,000 ~ 95,000 (49.2~66.8)	37,500 (26.4)	22	35	-

OTHER ELEMENTS : copper (0.40% MAX), Vanadium (0.03% MAX), Columbium (0.02% MAX.)

The sum of Cu, Ni, Cr and Mo shall not be exceed 1.00%

The sum of Cr and Mo shall not be exceed 0.32%

MATERIAL SPECIFICATIONS

APPLICABLE ASTM SPECIFICATIONS

GROUP 1 MATERIALS				PRODUCT FORMS			
Material Group No.	Nominal Designation Steel	Forgings		Castings		Plates	
		Spec. - Gr	Notes	Spec. - Gr	Notes	Spec. - Gr	Notes
1.1	Carbon	A105 A350 - LF2	(1)(3)	A216 - WCB	(1)	A515 - 70 A516 - 70 A537 - C1.1	(1) (1)
	C-Mn Si						
1.2	Carbon			A216 - WCC A352 - LCC	(1)		
	2-1/2 Ni			A352 - LC2		A203 - B	
	3-1/2 Ni	A350 - LF3		A352 - LC3		A203 - E	
1.3	Carbon			A352 - LCB	(1)	A203 - A A203 - D A515 - 65 A516 - 65	
1.4	Carbon					A515 - 60 A516 - 60	(1)
1.5	C - 1/2 Mo	A350 - LF1 CL1 A182 - F1	(2)	A217 - WC1 A352 - LC1	(2)(4)	A204 - A A204 - B A204 - C	(2) (2) (2)
1.7	C - 1/2 Mo						
	1/2 Cr - 1/2 Mo	A182 - F2					
	Ni - Cr - 1/2 Mo			A217 - WC4	(4)		
	3/4Ni - 3/4Cr - 1			A217 - WC5	(4)		
1.9	Mo	A182 - F12 CL2	(4)				
	1 Cr - 1/2 Mo	A182 - F11 CL2	(4)	A217 - WC6	(4)	A387 - 11 C1.2	
1.10	1 - 1/4 Cr - 1/2 Mo	A182 - F22 CL3		A217 - WC9	(4)	A387 - 22 C1.2	
1.13	2 - 1/4 Cr - 1 Mo	A182 - F5		A217 - C5	(4)		
	5 Cr - 1/2 Mo	A182 - F5a					
1.14	9 Cr - 1 Mo	A182 - F9		A217 - C12	(4)		

GROUP 2 MATERIALS				PRODUCT FORMS			
2.1	18 Cr - 8 Ni	A182 - F304	(5)	A351 - CF3		A240 - 304	(5)(6)
	18 Cr - 8 Ni	A182 - F304H		A351 - CF8	(5)	A240 - 304H	
2.2	16 Cr - 12 Ni - 2 Mo	A182 - F316 A182 - F316H	(5)	A351 - CF3M A351 - CF8M		A240 - 316 A240 - 316H	(5)(6)
	18 Cr - 13 Ni - 3 Mo					A240 - 317	(5)(6)
	19 Cr - 10 Ni - 3 Mo			A351 - CG8M	(5)		
2.3	18 Cr - 8 Ni	A182 - F304L				A240 - 304L	
	16 Cr - 12 Ni - 2 Mo	A182 - F316L				A240 - 316L	
2.4	18 Cr - 10 Ni - Ti	A182 - F321 A182 - F321H	(5)			A240 - 321 A240 - 321H	(5)(6)
	18 Cr - 10 Ni - Nb	A182 - F347 A182 - F347H A182 - F348 A182 - F348H	(5) (5)	A351 - CF8C	(5)	A240 - 347 A240 - 347H A240 - 348 A240 - 348H	(5)(6) (5)(6)
2.6	25 Cr - 12 Ni			A351 - CH8 A351 - CH20	(5) (5)		
	23 Cr - 12 Ni					A240 - 309H	(5)(6)
2.7	25 Cr - 20 Ni	A182 - F310	(5)(9)	A351 - CK20	(5)	A240 - 310H	(5)(6)(7)

General Notes:

- For temperature limitations see footnotes in Table 2 and in Annex G.
- Plate materials are listed only for use as blind flanges (see 5.1). Additional plate materials listed in ANSI B16.34 may also be used, with corresponding B16.34 Standard class ratings.
- Material Groups not listed in Table 1A are intended for use in valves. See ANSI B16.34.

Notes:

- Upon prolonged exposure to temperatures above about 800 °F (425 °C), the carbide phase of carbon steel may be converted to graphite.
- Upon prolonged exposure to temperatures above about 875 °F (470 °C), the carbide phase of carbon-molybdenum steel may be converted to graphite.
- Only killed steel shall be used above 850 °F (455 °C).
- Use normalized and tempered material only.
- At temperatures over 1000 °F (540 °C), use only when the carbon content is 0.04 percent or higher.
- For temperatures above 1000 °F (540 °C), use only if the material is heat treated by heating it to a temperature of at least 1900 °F (1040 °C) and quenching in water or rapidly cooling by other means.
- Service temperature of 1050 °F (565 °C) and above should be used only when assurance is provided that grain size is not finer than ASTM No. 6.