



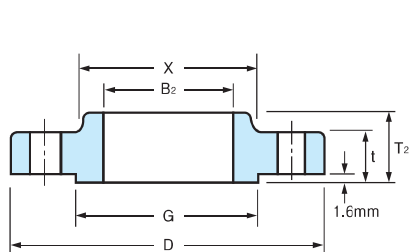
NUTECH OVERSEAS

Trusted Manufacturer for Critical Onshore & Offshore Projects

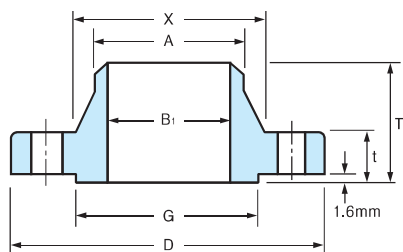




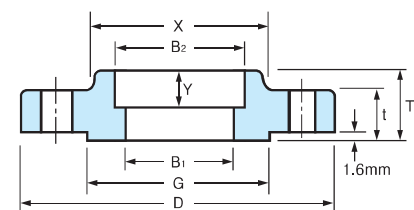
CLASS 150 FLANGES



SLIP-ON



WELDING NECK



SOCKET WELDING

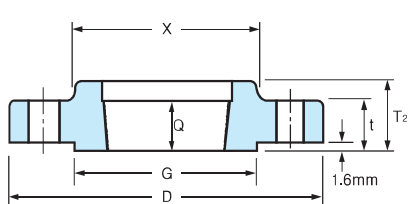
ANSI B16.5 FORGED FLANGES

Unit : mm

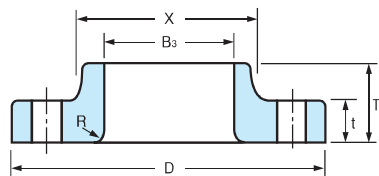
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick- ness	BORE			LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
					B ₁	B ₂	B ₃	T ₁	T ₂	T ₃			
1/2	89	30.2	35.1	11.2	15.7	22.4	22.9	47.8	15.7	15.7	21.3	3.0	15.7
3/4	99	38.1	42.9	12.7	20.8	27.7	28.2	52.3	15.7	15.7	26.7	3.0	15.7
1	108	49.3	50.8	14.2	26.7	34.5	35.1	55.6	17.5	17.5	33.5	3.0	17.5
1 1/4	117	58.7	63.5	15.7	35.1	43.2	43.7	57.2	20.6	20.6	42.2	4.8	20.6
1 1/2	127	65.0	73.2	17.5	40.9	49.5	50.0	62.0	22.4	22.4	48.3	6.4	22.4
2	152	77.7	91.9	19.1	52.6	62.0	62.5	63.5	25.4	25.4	60.5	7.9	25.4
2 1/2	178	90.4	104.6	22.4	62.7	74.7	75.4	69.9	28.4	28.4	73.2	7.9	28.4
3	191	108.0	127.0	23.9	78.0	90.7	91.4	69.9	30.2	30.2	88.9	9.7	30.2
3 1/2	216	122.2	139.7	23.9	90.2	103.4	104.1	71.4	31.8	31.8	101.6	9.7	31.8
4	229	134.9	157.2	23.9	102.4	116.1	116.8	76.2	33.3	33.3	114.3	11.2	33.3
5	254	163.6	185.7	23.9	128.3	143.8	144.5	88.9	36.6	36.6	141.2	11.2	36.6
6	279	192.0	215.9	25.4	154.2	170.7	171.5	88.9	39.6	39.6	168.4	12.7	39.6
8	343	246.1	269.7	28.4	202.7	221.5	222.3	101.6	44.5	44.5	219.2	12.7	44.5
10	406	304.8	323.9	30.2	254.5	276.4	277.4	101.6	49.3	49.3	273.1	12.7	49.3
12	483	365.3	381.0	31.8	304.8	327.2	328.2	114.3	55.6	55.6	323.9	12.7	55.6
14	533	400.1	412.8	35.1	336.6	359.2	360.2	127.0	57.2	79.2	355.6	12.7	57.2
16	597	457.2	469.9	36.6	387.4	410.5	411.2	127.0	63.5	87.4	406.4	12.7	63.5
18	635	505.0	533.4	39.6	438.2	461.8	462.3	139.7	68.3	96.8	457.2	12.7	68.3
20	699	558.8	584.2	42.9	489.0	531.1	514.4	144.5	73.2	103.1	508.0	12.7	73.2
24	813	663.4	692.2	47.8	590.6	616.0	616.0	152.4	82.6	111.3	609.6	12.7	82.6

Notes:

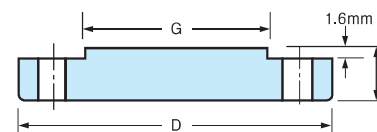
- (1) For the 'Bore' (B₁) other than Standard Wall Thickness, refer to page 52.
- (2) Class 150 flanges except Lap Joint will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

Unit : mm

Nominal Pipe Size	Depth of Socket Y	DRILLING			BOLTING			APPROXIMATE WEIGHT									
		Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	Machine Bolt Length	Stud Bolt Length	Welding Neck		Slip-on and Threaded		Lap Joint		Blind		Socket Welding	
								Raised Face	Ring Joint	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb
1/2	9.7	60.5	4	15.7	1/2	50.8	57.2	—	—	0.51	1.10	0.47	1.00	0.51	1.00	0.47	1.00
3/4	11.2	69.9	4	15.7	1/2	50.8	63.5	—	—	0.73	1.60	0.58	1.30	0.64	1.40	0.59	1.30
1	12.7	79.2	4	15.7	1/2	57.2	63.5	76.2	—	1.07	2.40	0.86	1.90	0.93	1.80	0.94	1.90
1 1/4	14.2	88.9	4	15.7	1/2	57.2	69.9	82.6	—	1.40	3.10	1.08	2.40	1.16	2.00	1.23	2.70
1 1/2	15.7	98.6	4	15.7	1/2	63.5	69.9	82.6	—	1.81	4.00	1.41	3.10	1.51	3.30	1.62	3.60
2	17.5	120.7	4	19.1	5/8	69.9	82.6	95.3	—	2.59	5.70	2.26	5.00	2.38	5.20	2.64	5.80
2 1/2	19.1	139.7	4	19.1	5/8	76.2	88.9	101.6	—	4.28	9.40	3.43	7.60	3.60	7.90	4.06	9.00
3	20.6	152.4	4	19.1	5/8	76.2	88.9	101.6	—	5.18	11.40	3.87	8.50	4.04	8.90	4.90	10.80
3 1/2	22.4	177.8	8	19.1	5/8	76.2	88.9	101.6	—	5.45	12.00	4.99	11.00	4.99	11.00	5.90	13.00
4	23.9	190.5	8	19.1	5/8	76.2	88.9	101.6	—	7.32	16.10	5.75	12.70	5.96	13.00	7.41	16.30
5	23.9	215.9	8	22.4	3/4	82.6	95.3	108.0	—	8.91	19.60	6.22	13.70	6.44	14.00	8.76	19.30
6	26.9	241.3	8	22.4	3/4	82.6	101.6	114.3	—	11.26	24.80	7.38	16.30	7.59	16.70	11.31	24.90
8	31.8	298.5	8	22.4	3/4	88.9	108.0	120.7	—	17.68	39.00	12.36	27.30	12.66	27.90	19.92	43.90
10	33.3	362.0	12	25.4	7/8	101.6	114.3	127.0	—	24.79	54.70	17.10	37.70	16.78	37.00	29.39	64.80
12	39.6	431.8	12	25.4	7/8	101.6	120.7	133.4	—	38.98	85.90	27.68	61.00	28.30	62.40	43.70	96.30
14	41.4	476.3	12	28.4	1	114.3	133.4	146.1	—	51.71	114.00	35.20	77.60	41.50	91.50	59.42	140.00
16	44.5	539.8	16	28.4	1	114.3	133.4	146.1	—	64.41	142.00	42.18	93.00	52.98	116.80	77.11	170.00
18	49.3	577.9	16	31.8	1 1/8	127.0	146.1	158.8	—	74.84	165.00	49.71	109.60	59.00	130.00	94.80	209.00
20	54.1	635.0	20	31.8	1 1/8	139.7	158.8	171.5	—	89.36	197.00	65.50	140.00	72.12	159.00	123.38	272.00
24	63.5	749.3	20	35.1	1 1/4	152.4	171.5	184.2	—	119.66	263.80	90.50	199.50	99.02	218.30	188.24	415.00

(4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

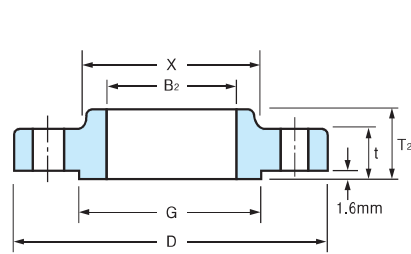
(5) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.

To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).

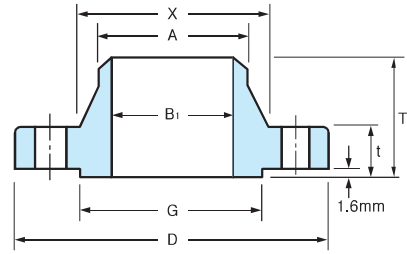
(6) Depth of Socket (Y) is covered by ANSI B16.5 only sizes through 3 inch, over 3 inch is at the manufacturer's option.



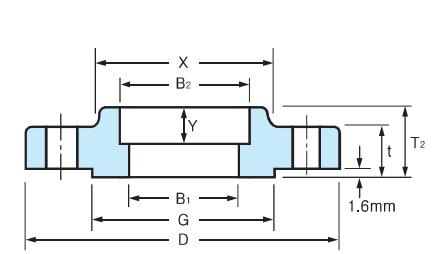
CLASS 300 FLANGES



SLIP-ON



WELDING NECK



SOCKET WELDING

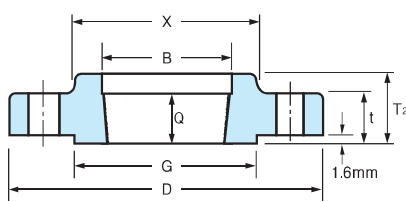
ANSI B16.5 FORGED FLANGES

Unit : mm

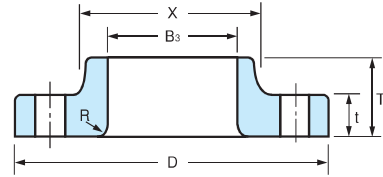
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Counter Bore Min. Threaded Min.	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	B ₁	B ₂	B ₃	B	T ₁	T ₂	T ₃	A	R	Q
1/2	95	38.1	35.1	14.2	15.7	22.4	22.9	23.6	52.3	22.4	22.4	21.3	3.0	15.7
3/4	117	47.8	42.9	15.7	20.8	27.7	28.2	29.0	57.2	25.4	25.4	26.7	3.0	15.7
1	124	53.8	50.8	17.5	26.7	34.5	35.1	35.8	62.0	26.9	26.9	33.5	3.0	17.5
1 1/4	133	63.5	63.5	19.1	35.1	43.2	43.7	44.5	65.0	26.9	26.9	42.2	4.8	20.6
1 1/2	155	69.9	73.2	20.6	40.9	49.5	50.0	50.5	68.3	30.2	30.2	48.3	6.4	22.4
2	165	84.1	91.9	22.4	52.6	62.0	62.5	63.5	69.9	33.3	33.3	60.5	7.9	28.4
2 1/2	191	100.1	104.6	25.4	62.7	74.7	75.4	76.2	76.2	38.1	38.1	73.2	7.9	31.8
3	210	117.3	127.0	28.4	78.0	90.7	91.4	92.2	79.2	42.9	42.9	88.9	9.7	31.8
3 1/2	229	133.4	139.7	30.2	90.2	103.4	104.1	104.9	81.0	44.5	44.5	101.6	9.7	36.6
4	254	146.1	157.2	31.8	102.4	116.1	116.8	117.6	85.9	47.8	47.8	114.3	11.2	36.6
5	279	177.8	185.7	35.1	128.3	143.8	144.5	144.5	98.6	50.8	50.8	141.2	11.2	42.9
6	318	206.2	215.9	36.6	154.2	170.7	171.5	171.5	98.6	52.3	52.3	168.4	12.7	46.0
8	381	260.4	269.7	41.1	202.7	221.5	222.3	222.3	111.3	62.0	62.0	219.2	12.7	50.8
10	445	320.5	323.9	47.8	254.5	276.4	277.4	276.4	117.3	66.5	95.3	273.1	12.7	55.6
12	521	374.7	381.0	50.8	304.8	327.2	328.2	328.7	130.0	73.2	101.6	323.9	12.7	60.5
14	584	425.5	412.8	53.8	336.6	359.2	360.2	360.4	142.7	76.2	111.3	355.6	12.7	63.5
16	648	482.6	469.9	57.2	387.4	410.5	411.2	411.2	146.1	82.6	120.7	406.4	12.7	68.3
18	711	533.4	533.4	60.5	438.2	461.8	462.3	462.0	158.8	88.9	130.0	457.2	12.7	69.9
20	775	587.2	584.2	63.5	489.0	513.1	514.4	512.8	162.1	95.3	139.7	508.0	12.7	73.2
24	914	701.5	692.2	69.9	590.6	616.0	616.0	614.4	168.1	106.4	152.4	609.6	12.7	82.6

Notes:

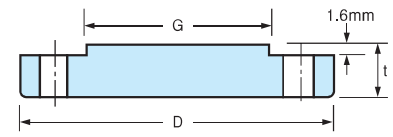
- (1) For the 'Bore' (B₁) other than Standard Wall Thickness, refer to page 52.
- (2) Class 300 flanges except Lap Joint will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

Unit : mm

Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT										
		Bolt Circle Diam	Number of Holes	Diam of Holes	Diam of Bolts (inch)	Machine Bolt Length	Stud Bolt Length			Welding Neck		Slip-on and Threaded		Lap Joint		Blind		Socket Welding	
							Raised Face	Raised Face	Ring Joint										
	Y								Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	
1/2	9.7	66.5	4	15.7	1/2	57.2	63.5	76.2	0.78	1.70	0.62	1.40	0.61	1.30	0.62	1.40	0.62	1.40	
3/4	11.2	82.6	4	19.1	5/8	63.5	76.2	88.9	1.34	3.00	1.15	2.50	1.15	2.50	1.16	2.50	1.19	2.60	
1	12.7	88.9	4	19.1	5/8	63.5	76.2	88.9	1.64	3.60	1.39	3.10	1.38	3.00	1.42	3.00	1.44	3.20	
1 1/4	14.2	98.6	4	19.1	5/8	69.9	82.6	95.3	2.06	4.50	1.67	3.70	1.66	3.70	1.79	3.90	1.73	3.80	
1 1/2	15.7	114.3	4	22.4	3/4	76.2	88.9	101.6	3.06	6.70	2.53	5.60	2.52	5.60	2.68	5.90	2.62	5.80	
2	17.5	127.0	8	19.1	5/8	76.2	88.9	101.6	3.40	7.50	2.80	6.20	2.79	6.20	3.09	6.80	2.94	6.50	
2 1/2	19.1	149.4	8	22.4	3/4	82.6	101.6	114.3	5.31	11.70	4.25	9.40	4.22	9.30	4.75	10.50	4.49	9.90	
3	20.6	168.1	8	22.4	3/4	88.9	108.0	120.7	7.32	16.10	5.81	12.80	5.78	12.70	6.79	14.90	6.20	13.70	
3 1/2	22.4	184.2	8	22.4	3/4	95.3	108.0	127.0	8.17	18.00	7.72	17.00	7.72	17.00	9.53	21.00			
4	23.9	200.2	8	22.4	3/4	95.3	114.3	127.0	11.30	24.90	10.13	22.30	10.07	22.20	12.00	26.50			
5	23.9	235.0	8	22.4	3/4	108.0	120.7	133.4	15.12	33.30	12.58	27.70	12.52	27.60	15.96	35.20			
6	26.9	269.7	12	22.4	3/4	108.0	120.7	139.7	19.68	43.40	16.04	35.40	15.95	35.20	21.20	46.70			
8	31.8	330.2	12	25.4	7/8	120.7	139.7	152.4	30.48	67.20	24.50	54.00	24.37	53.70	34.60	76.30			
10	33.3	387.4	16	28.4	1	139.7	158.8	171.5	43.74	96.40	34.16	75.30	39.92	88.00	55.34	122.00			
12	39.6	450.9	16	31.8	1 1/8	146.1	171.5	184.2	64.41	142.00	51.26	113.00	58.70	129.40	78.90	174.00			
14	41.4	514.4	20	31.8	1 1/8	158.8	177.8	190.5	88.30	194.70	72.12	159.00	83.46	184.00	107.05	236.00			
16	44.5	571.5	20	35.1	1 1/4	165.1	190.5	203.2	112.94	249.00	90.40	199.30	106.14	234.00	139.25	307.00			
18	49.3	628.7	24	35.1	1 1/4	171.5	196.9	209.6	138.34	305.00	109.00	240.30	133.95	295.30	176.90	396.00			
20	54.1	685.8	24	35.1	1 1/4	184.2	203.2	222.3	167.37	369.00	136.00	300.00	157.65	347.60	223.17	492.00			
24	63.5	812.8	24	41.1	1 1/2	203.2	228.6	254.0	235.41	519.00	204.00	449.70	240.40	530.00	342.00	754.00			

(4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

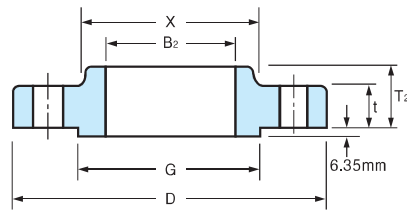
(5) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.

To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).

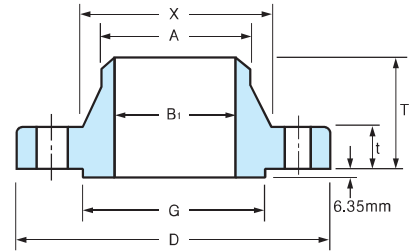
(6) Depth of Socket (Y) is covered by ANSI B16.5 only is sizes through 3 inch, over 3 inch is at the manufacturer's option.



CLASS 400 FLANGES



SLIP-ON



WELDING NECK

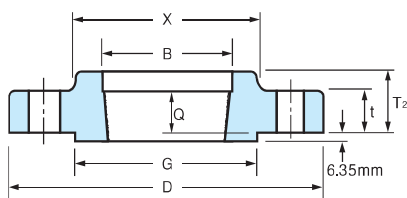
ANSI B16.5 FORGED FLANGES

Unit : mm

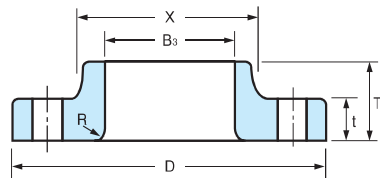
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel
					Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck	Slip-on And Threaded	Lap Joint	
	D	X	G	t	B ₁	B ₂	B ₃	B	T ₁	T ₂	T ₃	A
1/2	95	38.1	35.1	14.2	See Note(1) To be specified by purchaser.	22.4	22.9	23.6	52.3	22.4	22.4	21.3
3/4	117	47.8	42.9	15.7		27.7	28.2	29.0	57.2	25.4	25.4	26.7
1	124	53.8	50.8	17.5		34.5	35.1	35.8	62.0	26.9	26.9	33.5
1 1/4	133	63.5	63.5	20.6		43.2	43.7	44.5	66.5	28.4	28.4	42.2
1 1/2	155	69.9	73.2	22.4		49.5	50.0	50.5	69.9	31.8	31.8	48.3
2	165	84.1	91.9	25.4		62.0	62.5	63.5	73.2	36.6	36.6	60.5
2 1/2	191	100.1	104.6	28.4		74.7	75.4	76.2	79.2	41.1	41.1	73.2
3	210	117.3	127.0	31.8		90.7	91.4	92.2	82.6	46.0	46.0	88.9
3 1/2	229	133.4	139.7	35.1		103.4	104.1	104.9	85.9	49.3	49.3	101.6
4	254	146.1	157.2	35.1		116.1	116.8	117.6	88.9	50.8	50.8	114.3
5	279	177.8	185.7	38.1		143.8	144.5	144.5	101.6	53.8	53.8	141.2
6	318	206.2	215.9	41.1		170.7	171.5	171.5	103.1	57.2	57.2	168.4
8	381	260.4	269.7	47.8		221.5	222.3	222.3	117.3	68.3	68.3	219.2
10	445	320.5	323.9	53.8		276.4	277.4	276.4	124.0	73.2	101.6	273.1
12	521	374.7	381.0	57.2		327.2	328.2	328.7	136.7	79.2	108.0	323.9
14	584	425.5	412.8	60.5		359.2	360.2	360.4	149.4	84.1	117.3	355.6
16	648	482.6	469.9	63.5		410.5	411.2	411.2	152.4	93.7	127.0	406.4
18	711	533.4	533.4	66.5		461.8	462.3	462.0	165.1	98.6	136.7	457.2
20	775	587.2	584.2	69.9		513.1	514.4	512.8	168.1	101.6	146.1	508.0
24	914	701.5	692.2	76.2		616.0	616.0	614.4	174.8	114.3	158.8	609.6

Notes:

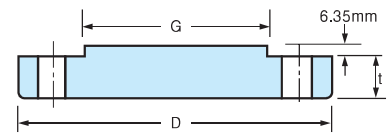
- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 400 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

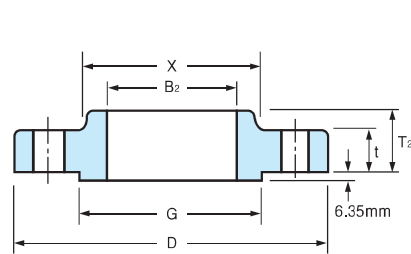
Unit : mm

Nominal Pipe Size	Radius of Fillet	Thread Length	DRILLING			BOLTING				APPROXIMATE WEIGHT							
							Stud Bolt Length										
			Bolt Circle Diam	Number of Holes	Diam of Holes		Diam of Bolts INCHES	0.25" Raised Face	Male-- Female Tongue-- Groove	Ring Joint	Welding Neck		Slip--on and Threaded		Lap Joint		Blind
	Kg	lb				Kg					lb	Kg	lb	Kg	lb		
1/2	3.0	15.7	66.5	4	15.7	1/2	76.2	69.9	76.2	1.36	3.00	0.91	2.00	0.80	1.80	0.91	2.00
3/4	3.0	15.7	82.6	4	19.1	5/8	88.9	82.6	88.9	1.59	3.50	1.36	3.00	1.36	3.00	1.40	3.00
1	3.0	17.5	88.9	4	19.1	5/8	88.9	82.6	88.9	1.81	4.00	1.59	3.50	1.59	3.50	1.70	3.80
1 1/4	4.8	20.6	98.6	4	19.1	5/8	95.3	88.9	95.3	2.50	5.50	2.10	4.60	2.04	4.50	2.27	5.00
1 1/2	6.4	22.4	114.3	4	22.4	3/4	108.0	101.6	108.0	3.63	8.00	3.10	6.80	2.95	6.50	3.40	7.50
2	7.9	28.4	127.0	8	19.1	5/8	108.0	101.6	108.0	4.54	10.00	3.63	8.00	3.63	8.00	4.40	9.70
2 1/2	7.9	31.8	149.4	8	22.4	3/4	120.7	114.3	120.7	6.35	14.00	5.44	12.00	4.99	11.00	6.80	15.00
3	9.7	35.1	168.1	8	22.4	3/4	127.0	120.7	127.0	8.17	18.00	7.26	16.00	6.35	14.00	8.90	19.60
3 1/2	9.7	39.6	184.2	8	25.4	7/8	139.7	133.4	139.7	11.80	26.00	9.53	21.00	9.08	20.00	13.17	29.00
4	11.2	36.6	200.2	8	25.4	7/8	139.7	133.4	139.7	13.61	30.00	10.89	24.00	9.98	22.00	14.40	31.70
5	11.2	42.9	235.0	8	25.4	7/8	146.1	139.7	146.1	17.69	39.00	14.07	31.00	13.15	29.00	19.50	43.00
6	12.7	46.0	269.7	12	25.4	7/8	152.4	146.1	152.4	22.23	49.00	19.98	44.00	16.78	37.00	27.67	61.00
8	12.7	50.8	330.2	12	28.4	1	171.5	165.1	171.5	35.38	78.00	30.40	67.00	26.16	59.00	45.36	100.00
10	12.7	55.6	387.4	16	31.8	1 1/8	190.5	184.2	190.5	49.89	110.00	41.28	91.00	43.09	95.00	68.00	150.00
12	12.7	60.5	450.9	16	35.1	1 1/4	203.2	196.9	203.2	72.57	160.00	59.02	130.00	68.95	152.00	98.00	216.00
14	12.7	63.5	514.4	20	35.1	1 1/4	209.6	203.2	209.6	105.69	233.00	81.72	180.00	95.25	210.00	131.66	290.00
16	12.7	68.3	571.5	20	38.1	1 3/8	222.3	215.9	222.3	133.30	294.00	106.69	235.00	127.00	280.00	167.00	368.00
18	12.7	69.9	628.7	24	38.4	1 3/8	228.6	222.3	228.6	158.90	350.30	129.39	285.30	156.49	345.00	206.57	455.40
20	12.7	73.2	685.8	24	41.1	1 1/2	241.3	235.0	247.7	193.00	425.50	152.00	335.00	190.51	420.00	261.00	575.40
24	12.7	82.6	812.8	24	47.8	1 3/4	266.7	260.4	279.4	281.48	620.50	231.54	510.50	278.96	615.00	395.00	870.80

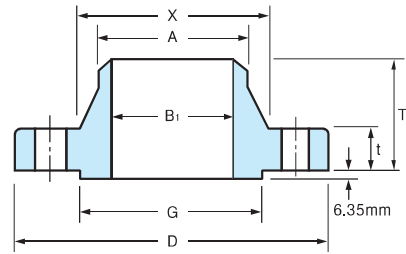
- (4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- (5) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
- (6) Dimensions of sizes 1/2" through 3-1/2" are the same as for Class 600 Flanges



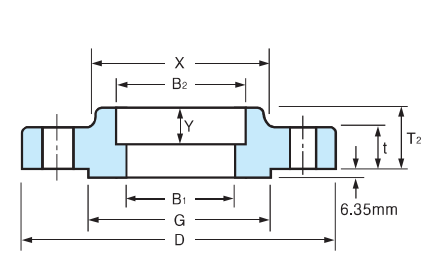
CLASS 600 FLANGES



SLIP-ON



WELDING NECK



SOCKET WELDING

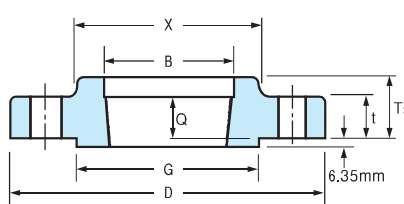
ANSI B16.5 FORGED FLANGES

Unit : mm

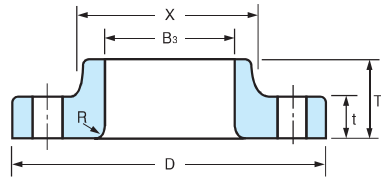
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Counter Bore Min.	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	B ₁	B ₂	B ₃	B	T ₁	T ₂	T ₃	A	R	Q
1/2	95	38.1	35.1	14.2	See Note(1) To be specified by purchaser.	22.4	22.9	23.6	52.3	22.4	22.4	21.3	3.0	15.7
3/4	117	47.8	42.9	15.7		27.7	28.2	29.0	57.2	25.4	25.4	26.7	3.0	15.7
1	124	53.8	50.8	17.5		34.5	35.1	35.8	62.0	26.9	26.9	33.5	3.0	17.5
1 1/4	133	63.5	63.5	20.6		43.2	43.7	44.5	66.5	28.4	28.4	42.2	4.8	20.6
1 1/2	155	69.9	73.2	22.4		49.5	50.0	50.5	69.9	31.8	31.8	48.3	6.4	22.4
2	165	84.1	91.9	25.4		62.0	62.5	63.5	73.2	36.6	36.6	60.5	7.9	28.4
2 1/2	191	100.1	104.6	28.4		74.7	75.4	76.2	79.2	41.1	41.1	73.2	7.9	31.8
3	210	117.3	127.0	31.8		90.7	91.4	92.2	82.6	46.0	46.0	88.9	9.7	35.1
3 1/2	229	133.4	139.7	35.1		103.4	104.1	104.9	85.9	49.3	49.3	101.6	9.7	39.6
4	273	152.4	157.2	38.1		116.1	116.8	117.6	101.6	53.8	53.8	114.3	11.2	41.1
5	330	189.0	185.7	44.5		143.8	144.5	144.5	114.3	60.5	60.5	141.2	11.2	47.8
6	356	222.3	215.9	47.8		170.7	171.5	171.5	117.3	66.5	66.5	168.4	12.7	50.8
8	419	273.1	269.7	55.6		221.5	222.3	222.3	133.4	76.2	76.2	219.2	12.7	57.2
10	508	342.9	323.9	63.5		276.4	277.4	276.4	152.2	85.9	111.3	273.1	12.7	65.0
12	559	400.1	381.0	66.5		327.2	328.2	328.7	155.4	91.9	117.3	323.9	12.7	69.9
14	603	431.8	412.8	69.9		359.2	360.2	360.4	165.1	93.7	127.0	355.6	12.7	73.2
16	686	495.3	469.9	76.2		410.5	411.2	411.2	177.8	106.4	139.7	406.4	12.7	77.7
18	743	546.1	533.4	82.6		461.8	462.3	462.0	184.2	117.3	152.4	457.2	12.7	79.2
20	813	609.6	584.2	88.9		513.1	514.4	512.8	190.5	127.0	165.1	508.0	12.7	82.6
24	940	717.6	692.2	101.6		616.0	616.0	614.4	203.2	139.7	184.2	609.6	12.7	91.9

Notes:

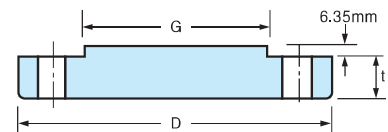
- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 600 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded, Lap Joint and Socket Welding Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

Unit : mm

Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT									
					Diam of Bolts (inch)	Stud Bolt Length												
		Bolt Circle Diam	Number of Holes	Diam of Holes		0.25" Raised Face	Male- Female Tongue- Groove	Ring Joint	Welding Neck		Slip-on and Threaded		Lap Joint		Blind		Socket Welding	
									Kg	lb	Kg	lb	Kg	lb	Kg	lb	Kg	lb
1/2	9.7	66.5	4	15.7	1/2	76.2	69.9	76.2	0.90	2.00	0.91	2.00	0.80	1.80	0.91	2.00	0.91	2.00
3/4	11.2	82.6	4	19.1	5/8	88.9	82.6	88.9	1.59	3.50	1.40	3.00	1.36	3.00	1.40	3.00	1.36	3.00
1	12.7	88.9	4	19.1	5/8	88.9	82.6	88.9	1.90	4.00	1.70	3.70	1.59	3.50	1.81	4.00	1.81	4.00
1 1/4	14.2	98.6	4	19.1	5/8	95.3	88.9	95.3	2.49	5.50	2.27	5.00	2.04	4.50	2.40	5.30	2.60	5.70
1 1/2	15.7	114.3	4	22.4	3/4	108.0	101.6	108.0	3.63	8.00	3.10	6.80	2.95	6.50	3.40	7.50	3.18	7.00
2	17.5	127.0	8	19.1	5/8	108.0	101.6	108.0	4.54	10.00	3.63	8.00	3.63	8.00	4.40	9.70	3.90	8.60
2 1/2	19.1	149.4	8	22.4	3/4	120.7	114.3	120.7	6.35	14.00	5.44	12.00	4.99	11.00	6.80	15.00	5.90	13.00
3	20.6	168.1	8	22.4	3/4	127.0	120.7	127.0	8.16	18.00	7.26	16.00	6.35	14.00	8.90	19.60	7.40	16.30
3 1/2	22.4	184.2	8	25.4	7/8	139.7	133.4	139.7	11.80	26.00	9.53	21.00	9.08	20.00	13.17	29.00		
4	23.9	215.9	8	25.4	7/8	146.1	139.7	146.1	16.78	37.00	14.97	33.00	14.06	31.00	18.60	41.00		
5	23.9	266.7	8	28.4	1	165.1	158.8	165.1	30.87	68.00	28.50	62.80	27.50	60.60	30.84	68.00		
6	26.9	292.1	12	28.4	1	171.5	165.1	171.5	36.77	80.00	36.32	80.00	35.38	78.00	38.00	83.80		
8	31.8	349.3	12	31.8	1 1/8	190.5	184.2	196.9	50.80	112.00	44.00	97.00	50.80	112.00	62.20	137.00		
10	33.3	431.8	16	35.1	1 1/4	215.9	209.6	215.9	86.26	190.00	76.20	168.00	74.00	163.00	102.00	224.90		
12	39.6	489.0	20	35.1	1 1/4	222.3	215.9	222.3	102.51	226.00	97.52	215.00	108.86	240.00	132.00	291.00		
14	41.4	527.1	20	38.1	1 3/8	235.0	228.6	235.0	121.56	268.00	102.00	224.80	111.00	244.70	158.00	384.30		
16	44.5	603.3	20	41.1	1 1/2	254.0	247.7	254.0	177.06	290.00	147.82	330.20	165.71	365.30	224.73	495.40		
18	49.3	645.1	20	44.5	1 5/8	273.1	266.7	273.1	215.65	475.40	180.10	412.30	194.00	427.70	285.00	628.30		
20	54.1	723.9	24	44.5	1 5/8	285.8	279.4	292.1	267.86	590.50	231.54	510.50	258.78	570.50	365.00	804.70		
24	63.5	838.2	24	50.8	1 7/8	330.2	323.9	336.6	372.00	820.00	330.00	725.50	362.00	798.00	533.45	1176.0		

(4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

(5) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.

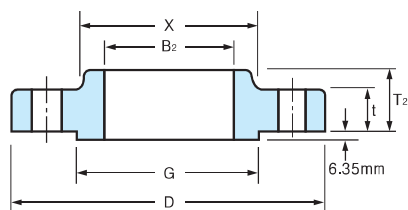
To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).

(6) Dimensions of sizes 1/2" through 3-1/2" are the same as for Class 400 Flanges

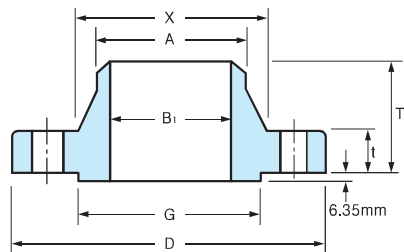
(7) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.



CLASS 900 FLANGES



SLIP-ON



WELDING NECK

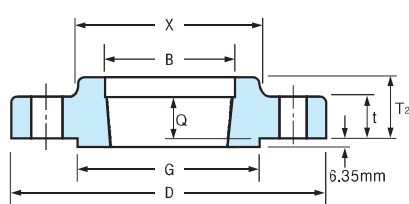
ANSI B16.5 FORGED FLANGES

Unit : mm

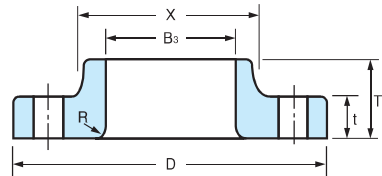
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel
					Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck	Slip-on And Threaded	Lap Joint	
	D	X	G	t	B ₁	B ₂	B ₃	B	T ₁	T ₂	T ₃	A
1/2	121	38.1	35.1	22.4	See Note(1) To be specified by purchaser.	22.4	22.9	23.6	60.5	31.8	31.8	21.3
3/4	130	44.5	42.9	25.4		27.7	28.2	29.0	69.9	35.1	35.1	26.7
1	149	52.3	50.8	28.4		34.5	35.1	35.8	73.2	41.1	41.1	33.5
1 1/4	159	63.5	63.5	28.4		43.2	43.7	44.5	73.2	41.1	41.1	42.2
1 1/2	178	69.9	73.2	31.8		49.5	50.0	50.5	82.6	44.5	44.5	48.3
2	216	104.6	91.9	38.1		62.0	62.5	63.5	101.6	57.2	57.2	60.5
2 1/2	244	124.0	104.6	41.1		74.7	75.4	76.2	104.6	63.5	63.5	73.2
3	241	127.0	127.0	38.1		90.7	91.4	92.2	101.6	53.8	53.8	88.9
4	292	158.8	157.2	44.5		116.1	116.8	117.6	114.3	69.9	69.9	114.3
5	349	190.5	185.7	50.8		143.8	144.5	144.5	127.0	79.2	79.2	141.2
6	381	235.0	215.9	55.6		170.7	171.5	171.5	139.7	85.9	85.9	168.4
8	470	298.5	269.7	63.5		221.5	222.3	222.3	162.1	101.6	114.3	219.2
10	546	368.3	323.9	69.9		276.4	277.4	276.4	184.2	108.0	127.0	273.1
12	610	419.1	381.0	79.2		327.2	328.2	328.7	200.2	117.3	142.7	323.9
14	641	450.9	412.8	85.9		359.2	360.2	360.4	212.9	130.0	155.4	355.6
16	705	508.0	469.9	88.9		410.5	411.2	411.2	215.9	133.4	165.1	406.4
18	787	565.2	533.4	101.6		461.8	462.3	462.0	228.6	152.4	190.5	457.2
20	857	622.3	584.2	108.0		513.1	514.4	512.8	247.7	158.8	209.6	508.0
24	1041	749.3	692.2	139.7		616.0	616.0	614.4	292.1	203.2	266.7	609.6

Notes:

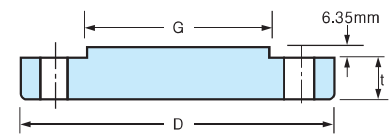
- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 900 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

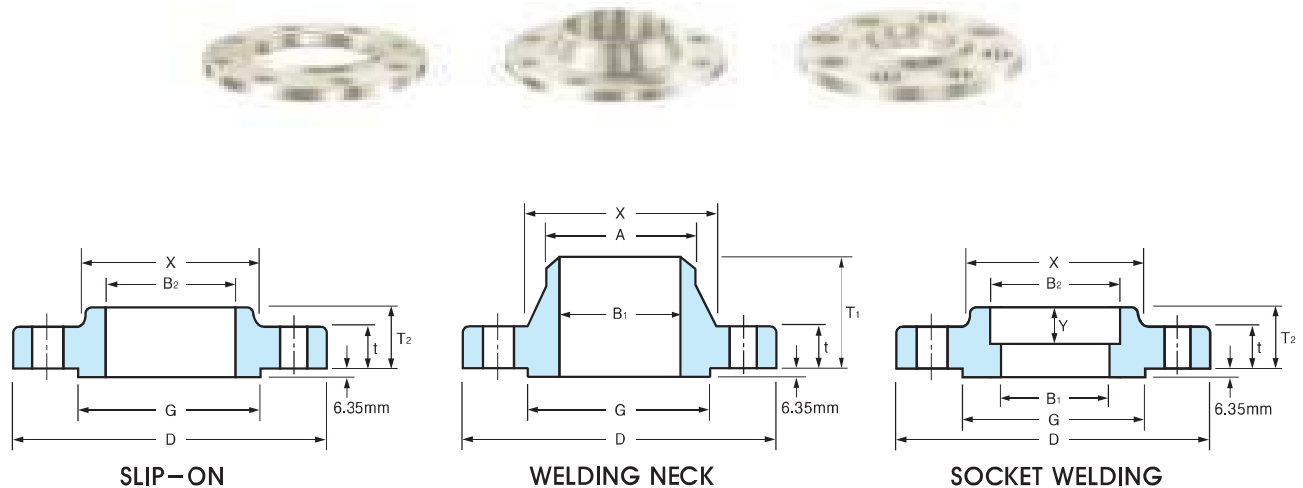
Unit : mm

Nominal Pipe Size	Radius of Fillet	Thread Length	DRILLING			BOLTING				APPROXIMATE WEIGHT							
						Diam of Bolts (inch)	Stud Bolt Length										
			Bolt Circle Diam	Number of Holes	Diam of Holes		0.25" Raised Face	Male— Female Tongue— Groove	Ring Joint	Welding Neck		Slip-on and Threaded		Lap Joint		Blind	
	Kg	lb				Kg				lb	Kg	lb	Kg	lb			
1/2	3.0	22.4	82.6	4	22.4	3/4	108.0	101.6	108.0	2.10	4.60	1.81	4.00	1.81	4.00	1.90	4.20
3/4	3.0	25.4	88.9	4	22.4	3/4	114.3	108.0	114.3	2.72	6.00	2.40	5.30	2.30	5.00	2.70	6.00
1	3.0	28.4	101.6	4	25.4	7/8	127.0	120.7	127.0	3.86	8.50	3.41	7.50	3.40	7.50	4.09	9.00
1 1/4	4.8	30.2	111.3	4	25.4	7/8	127.0	120.7	127.0	4.54	10.00	4.10	9.00	4.09	9.00	4.54	10.00
1 1/2	6.4	31.8	124.0	4	28.4	1	139.7	133.4	139.7	5.90	13.00	5.45	12.00	5.40	11.90	5.90	13.00
2	7.9	38.1	165.1	8	25.4	7/8	146.1	139.7	146.1	10.89	24.00	9.98	22.00	9.53	21.00	11.34	25.00
2 1/2	7.9	47.8	190.5	8	28.4	1	158.8	152.4	158.8	16.33	36.00	15.80	34.80	13.15	29.00	16.00	35.30
3	9.7	41.1	190.5	8	25.4	7/8	146.1	139.7	146.1	15.00	33.00	11.80	26.00	11.34	25.00	13.17	29.00
4	11.2	47.8	235.0	8	31.8	1 1/8	171.5	165.1	171.5	23.13	51.00	23.20	51.00	22.60	48.50	24.50	54.00
5	11.2	53.8	279.4	8	35.1	1 1/4	190.5	184.2	190.5	38.50	84.90	37.65	83.00	36.74	81.00	39.46	87.00
6	12.7	57.2	317.5	12	31.8	1 1/8	190.5	184.2	196.9	49.89	110.00	48.30	106.50	47.50	104.70	51.50	113.50
8	12.7	63.5	393.7	12	38.1	1 3/8	222.3	215.9	222.3	79.45	175.00	75.00	166.30	86.00	189.60	89.00	106.20
10	12.7	71.4	469.9	16	38.1	1 3/8	235.0	228.6	235.0	118.04	260.00	111.13	245.00	125.64	277.00	131.54	290.00
12	12.7	76.2	533.4	20	38.1	1 3/8	254.0	247.7	254.0	157.00	346.00	146.00	321.80	167.00	368.00	187.00	412.30
14	12.7	82.6	558.8	20	41.1	1 1/2	273.1	266.7	292.1	181.60	400.40	172.36	380.00	180.07	397.00	224.07	494.00
16	12.7	85.9	616.0	20	44.5	1 5/8	285.8	279.4	298.5	224.73	495.50	192.95	425.40	211.11	465.40	272.40	600.50
18	12.7	88.9	685.8	20	50.8	1 7/8	323.9	317.5	333.6	308.72	680.60	272.40	600.50	295.10	650.60	385.90	850.80
20	12.7	91.9	749.3	20	53.8	2	349.3	342.9	362.0	376.82	830.70	331.42	730.60	367.74	810.70	488.00	1076.00
24	12.7	101.6	901.7	20	66.5	2 1/2	438.2	431.8	457.2	685.00	1510.00	632.00	1393.30	700.00	1543.00	905.00	1995.00

- (4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- (5) 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 (t).
- (6) Dimensions of sizes 1/2" through 2 1/2" are the same as for Class 1500 Flanges



CLASS 1500 FLANGES



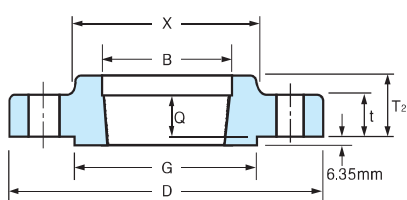
ANSI B16.5 FORGED FLANGES

Unit : mm

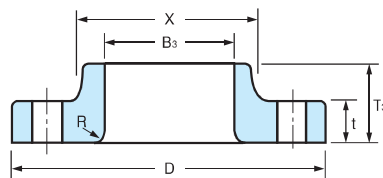
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thickness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck Socket Welding	Slip-on Socket Welding	Lap Joint	Counter Bore Min.	Welding Neck	Slip-on Threaded Socket Welding	Lap Joint			
	D	X	G	t	B ₁	B ₂	B ₃	B	T ₁	T ₂	T ₃	A	R	Q
1/2	121	38.1	35.1	22.4	See Note(1) To be specified by purchaser.	22.4	22.9	23.6	60.5	31.8	31.8	21.3	3.0	22.4
3/4	130	44.5	42.9	25.4		27.7	28.2	29.0	69.9	35.1	35.1	26.7	3.0	25.4
1	149	52.3	50.8	28.4		34.5	35.1	35.8	73.2	41.1	41.1	33.5	3.0	28.4
1 1/4	159	63.5	63.5	28.4		43.2	43.7	44.5	73.2	41.1	41.1	42.2	4.8	30.2
1 1/2	178	69.9	73.2	31.8		49.5	50.0	50.5	82.6	44.5	44.5	48.3	6.4	31.8
2	216	104.6	91.9	38.1		62.0	62.5	63.5	101.6	57.2	57.2	60.5	7.9	38.1
2 1/2	244	124.0	104.6	41.1		74.7	75.4	76.2	104.6	63.5	63.5	73.2	7.9	47.8
3	267	133.4	127.0	47.8		90.7	91.4	92.2	117.3	73.2	73.2	88.9	9.7	50.8
4	311	162.1	157.2	53.8		116.1	116.8	117.6	124.0	90.4	90.4	114.3	11.2	57.2
5	375	196.9	185.7	73.2		143.8	144.5	144.5	155.4	104.6	104.6	141.2	11.2	63.5
6	394	228.6	215.9	82.6		170.7	171.5	171.5	171.5	119.1	119.1	168.4	12.7	69.9
8	483	292.1	269.7	91.9		221.5	222.3	222.3	212.9	142.7	142.7	219.2	12.7	76.2
10	584	368.3	323.9	108.0		276.4	277.4	276.4	254.0	158.8	177.8	273.1	12.7	84.1
12	673	450.9	381.0	124.0		327.2	328.2	328.7	282.4	180.8	218.9	323.9	12.7	91.9
14	749	495.3	412.8	133.4		359.2	360.2	360.4	298.5	—	241.3	355.6	12.7	—
16	826	552.5	469.9	146.1		410.5	411.2	411.2	311.2	—	260.4	406.4	12.7	—
18	914	596.9	533.4	162.1		461.8	462.3	462.0	327.2	—	276.4	457.2	12.7	—
20	984	641.4	584.2	177.8		513.1	514.4	512.8	355.6	—	292.1	508.0	12.7	—
24	1168	762.0	692.2	203.2		616.0	616.0	614.4	406.4	—	330.2	609.6	12.7	—

Notes:

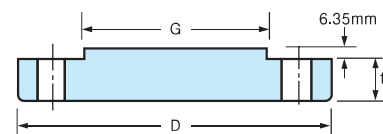
- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 1500 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded, Lap Joint and Socket Welding Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

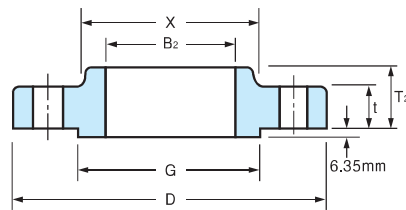
Unit : mm

Nominal Pipe Size	Depth of Socket	DRILLING			BOLTING			APPROXIMATE WEIGHT										
					Diam of Bolts (inch)	Stud Bolt Length												
		Bolt Circle Diam	Number of Holes	Diam of Holes		0.25" Raised Face	Male-- Female Tongue- Groove	Ring Joint	Welding Neck		Slip-on and Threaded		Lap Joint		Blind		Socket Welding	
Kg	lb				Kg				lb	Kg	lb	Kg	lb	Kg	lb			
1/2	9.7	82.6	4	22.4	3/4	108.0	101.6	108.0	2.10	4.60	1.80	4.00	1.80	4.00	1.90	4.00	1.81	4.00
3/4	11.2	88.9	4	22.4	3/4	114.3	108.0	114.3	2.72	6.00	2.27	5.00	2.27	5.00	2.72	6.00	2.81	6.20
1	12.7	101.6	4	25.4	7/8	127.0	120.7	127.0	3.86	8.50	3.40	7.50	3.40	7.50	4.08	9.00	3.61	8.00
1 1/4	14.2	111.3	4	25.4	7/8	127.0	120.7	127.0	4.54	10.00	4.10	9.00	4.09	10.80	4.30	9.50	4.99	11.00
1 1/2	15.7	124.0	4	28.4	1	139.7	133.4	139.7	5.90	13.00	5.45	12.00	5.40	11.90	5.90	13.00	6.76	14.90
2	17.5	165.1	8	25.4	7/8	146.1	139.7	146.1	10.89	24.00	10.50	23.00	9.53	21.00	11.30	25.00	10.89	24.00
2 1/2	19.1	190.5	8	28.4	1	158.8	152.4	158.8	16.34	36.00	15.80	34.80	13.15	29.00	16.00	35.30	16.34	36.00
3	20.6	203.2	8	31.8	1 1/8	177.8	171.5	177.8	21.79	48.00	21.77	48.00	17.24	38.00	21.79	48.00		
4	23.9	241.3	8	35.1	1 1/4	196.9	190.5	196.9	31.30	69.00	31.00	68.40	29.00	63.90	33.11	73.00		
5	23.9	292.1	8	41.1	1 1/2	247.7	241.3	247.7	59.02	130.00	58.80	129.60	54.00	119.00	60.00	132.30		
6	26.9	317.5	12	38.1	1 3/8	260.4	254.0	266.7	74.91	165.00	74.00	163.00	62.00	136.70	75.00	165.30		
8	31.8	393.7	12	44.5	1 5/8	292.1	285.8	323.9	123.83	273.00	117.73	258.00	129.73	236.00	136.98	302.00		
10	33.3	482.6	12	50.8	1 7/8	336.6	330.2	342.9	205.93	454.00	197.49	435.40	220.19	485.40	229.97	507.00		
12	39.6	571.5	16	53.8	2	374.7	368.3	387.4	306.00	674.60	264.00	582.00	286.02	630.60	316.00	696.70		
14	41.4	635.0	16	60.5	2 1/4	406.4	400.1	425.5	416.00	917.00	—	—	404.06	890.80	421.00	928.00		
16	44.5	704.9	16	66.5	2 1/2	444.5	438.2	469.9	567.50	1250.00	—	—	522.10	1151.00	559.00	1232.70		
18	49.3	774.7	16	73.2	2 3/4	495.3	489.0	527.1	736.00	1622.60	—	—	669.65	1476.30	761.00	1677.70		
20	54.1	831.9	16	79.2	3	539.8	533.4	565.2	929.00	2048.00	—	—	805.85	1776.60	976.00	2131.80		
24	63.5	990.6	16	91.9	3 1/2	616.0	609.6	647.7	1504.00	3315.70	—	—	1285.55	2834.00	1568.00	3456.80		

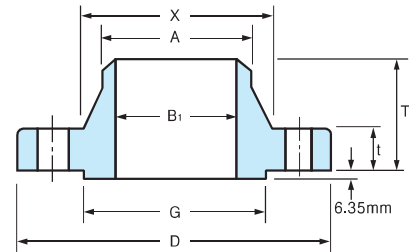
- (4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- (5) The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree.
To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
- (6) Dimensions of sizes 1/2" through 2 1/2" are the same as for Class 900 Flanges
- (7) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 2 1/2 inch, over 2 1/2 inch is at the manufacturer's option.



CLASS 2500 FLANGES



SLIP-ON



WELDING NECK

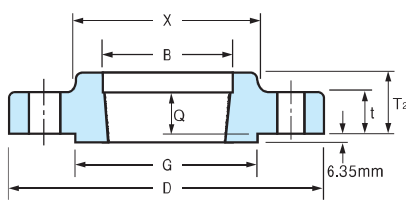
ANSI B16.5 FORGED FLANGES

Unit : mm

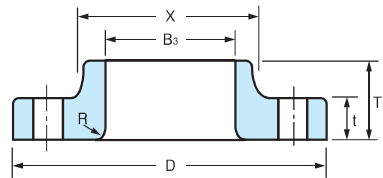
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O. D. of Raised Face	Thick-ness	BORE				LENGTH THRU HUB			Diam. of Hub at Bevel	Radius of Fillet	Thread Length
					Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck	Slip-on and Threaded	Lap Joint			
	D	X	G	t	B ₁	B ₂	B ₃	B	T ₁	T ₂	T ₃	A	R	Q
1/2	133	42.9	35.1	30.2	To be specified by purchaser.	22.4	22.9	23.6	73.2	39.6	39.6	21.3	3.0	28.4
3/4	140	50.8	42.9	31.8		27.7	28.2	29.0	79.2	42.9	42.9	26.7	3.0	31.8
1	159	57.2	50.8	35.1		34.5	35.1	35.8	88.9	47.8	47.8	33.5	3.0	35.1
1 1/4	184	73.2	63.5	38.1		43.2	43.7	44.5	95.3	52.3	52.3	42.2	4.8	38.1
1 1/2	203	79.2	73.2	44.5		49.5	50.0	50.5	111.3	60.5	60.5	48.3	6.4	44.5
2	235	95.3	91.9	50.8		62.0	62.5	63.5	127.0	69.9	69.9	60.5	7.9	50.8
2 1/2	267	114.3	104.6	57.2		74.7	75.4	76.2	142.7	79.2	79.2	73.2	7.9	57.2
3	305	133.4	127.0	66.5		90.7	91.4	92.2	168.1	91.9	91.9	88.9	9.7	63.5
4	356	165.1	157.2	76.2		116.1	116.8	117.6	190.5	108.0	108.0	114.3	11.2	69.9
5	419	203.2	185.7	91.9		143.8	144.5	144.5	228.6	130.0	130.0	141.2	11.2	76.2
6	483	235.0	215.9	108.0		170.7	171.5	171.5	273.1	152.4	152.4	168.4	12.7	82.6
8	552	304.8	269.7	127.0		221.5	222.3	222.3	317.5	177.8	177.8	219.2	12.7	95.3
10	673	374.7	323.9	165.1		276.4	277.4	276.4	419.1	228.6	228.6	273.1	12.7	108.0
12	762	441.5	381.0	184.2		327.2	328.2	328.7	463.6	254.0	254.0	323.9	12.7	120.7

Notes:

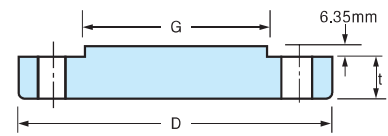
- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 2500 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁), (T₂).
- (3) For Slip-on, Threaded and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

Unit : mm

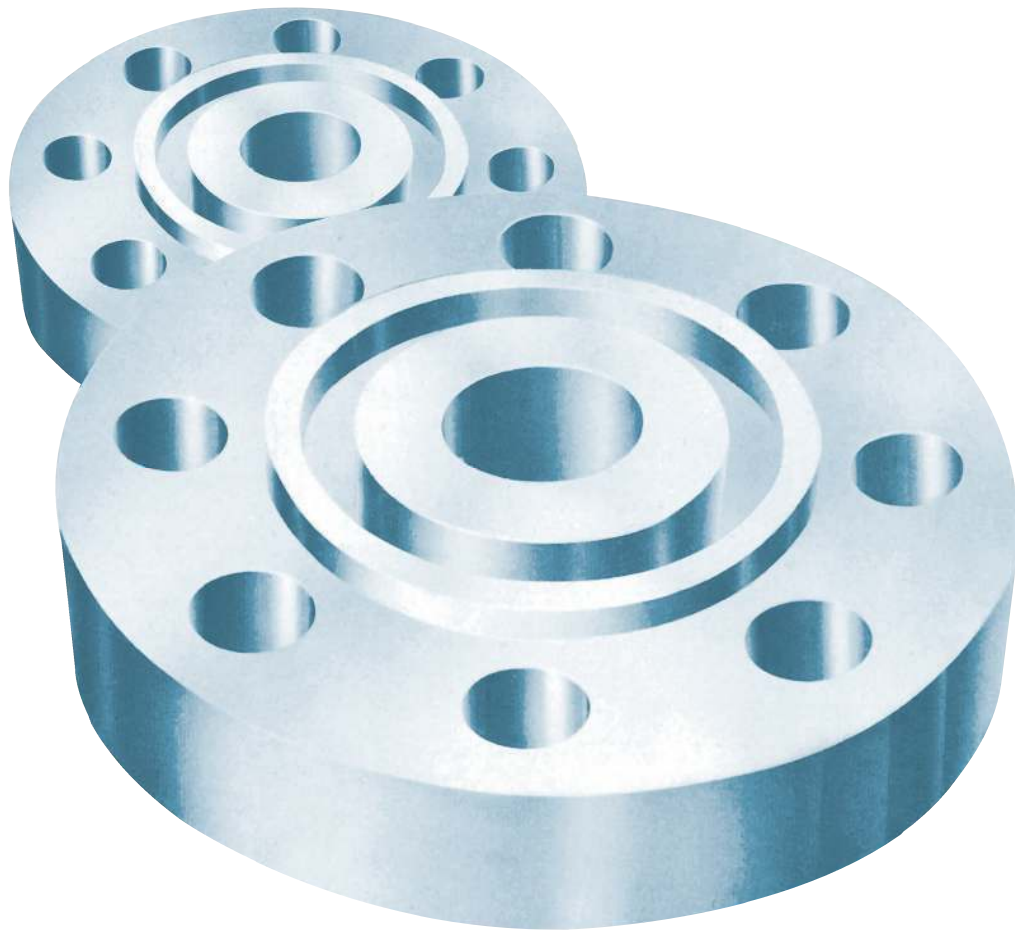
Nominal Pipe Size	DRILLING			BOLTING				APPROXIMATE WEIGHT							
				Stud Bolt Length				Welding Neck		Slip-on and Threaded		Lap Joint		Blind	
				Diam of Bolts (inch)	0.25" Raised Face	Male- Female Tongue- Groove	Ring Joint								
	Bolt Circle Diam	Number of Holes	Diam of Holes					Kg	lb	Kg	lb	Kg	lb	Kg	lb
1/2	88.9	4	22.4	3/4	120.7	114.3	120.7	3.18	7.00	3.18	7.00	3.00	6.60	3.18	7.00
3/4	95.3	4	22.4	3/4	127.0	120.7	127.0	4.08	9.00	4.08	9.00	3.63	8.00	4.08	10.00
1	108.0	4	25.4	7/8	139.7	133.4	139.7	5.45	12.00	5.44	12.00	4.99	11.00	5.44	12.00
1 1/4	130.0	4	28.4	1	152.4	146.1	152.4	9.07	20.00	8.16	18.00	7.26	16.00	8.16	18.00
1 1/2	146.1	4	31.8	1 1/8	171.5	165.1	171.5	11.35	25.00	11.00	24.30	9.99	22.00	10.44	23.00
2	171.5	8	28.4	1	177.8	171.5	177.8	19.07	42.00	17.25	38.00	16.80	37.00	17.71	39.00
2 1/2	196.9	8	31.8	1 1/8	196.9	190.5	203.2	23.61	52.00	24.97	55.00	24.06	53.00	25.42	56.00
3	228.6	8	35.1	1 1/4	222.3	215.9	228.6	42.68	94.00	37.68	83.00	36.32	80.00	39.04	86.00
4	273.1	8	41.1	1 1/2	254.0	247.7	260.4	64.00	141.00	58.00	127.90	54.48	120.00	60.38	133.00
5	323.9	8	47.8	1 3/4	298.5	292.1	311.2	110.68	244.00	95.25	210.00	92.53	204.00	101.15	223.00
6	368.2	8	53.8	2	342.9	336.6	355.6	176.46	378.00	146.51	323.00	143.01	315.30	156.63	345.30
8	438.2	12	53.8	2	381.0	374.7	393.7	261.27	576.00	219.99	485.00	213.38	470.40	240.62	530.50
10	539.8	12	66.5	2 1/2	489.0	482.6	508.0	484.43	1068.00	419.57	925.00	408.60	900.80	465.36	1026.00
12	619.3	12	73.2	2 3/4	539.8	533.4	558.8	692.35	1526.30	590.20	1301.00	572.95	1263.00	664.06	1464.00

(4) Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

(5) 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 (t).

(6) Class 2500 Slip-on Flanges are not covered by ANSI B16.5, slip-on flanges are at the manufacturer's option.



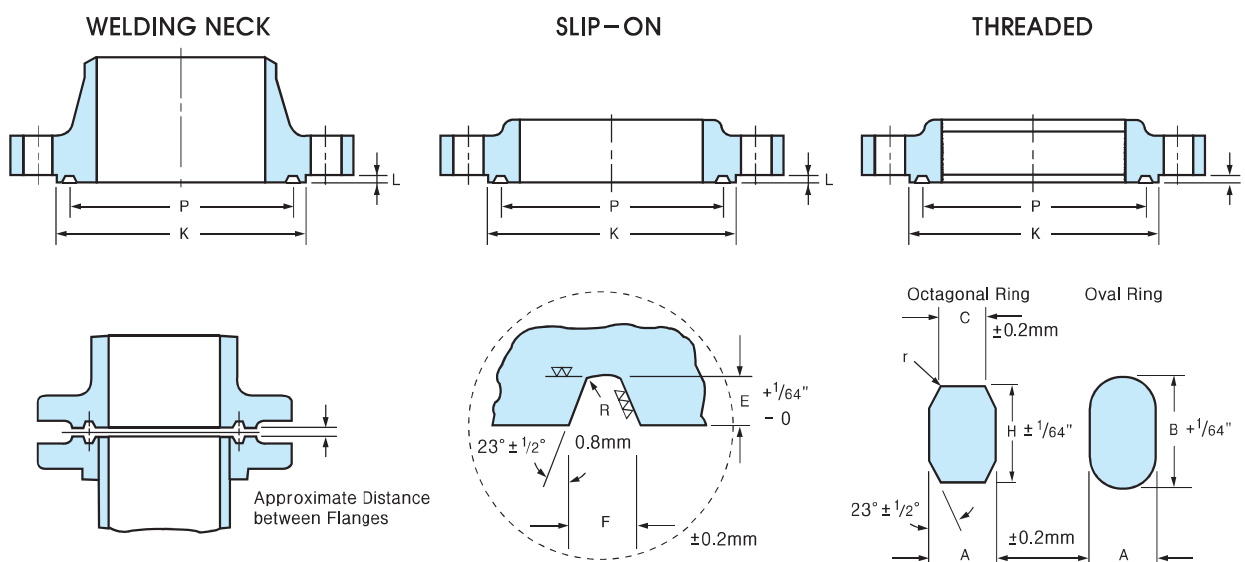
NUTECH OVERSEAS

- Class 150 Flanges
- Class 300, 400, 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges



CLASS 150 FLANGES

RING JOINT FLANGES FACING DIMENSIONS



ANSI B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Pitch Diam. of Ring and Groove	Width of Ring	HEIGHT OF RING		Width of Flat on Octagonal Rings	Width of Groove	Depth of Groove	Diameter of Raised Face for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges of Ring Joints When Ring is Compressed
			Oval	Octagonal						
	P	A	B	H	C	F	E (L*)	K (Min)		
1	47.6	8.0	14.3	12.7	5.2	8.7	6.4	63.5	R 15	4.1
1 1/4	57.2	8.0	14.3	12.7	5.2	8.7	6.4	73.2	R 17	4.1
1 1/2	65.1	8.0	14.3	12.7	5.2	8.7	6.4	82.6	R 19	4.1
2	82.6	8.0	14.3	12.7	5.2	8.7	6.4	101.6	R 22	4.1
2 1/2	101.6	8.0	14.3	12.7	5.2	8.7	6.4	120.7	R 25	4.1
3	114.3	8.0	14.3	12.7	5.2	8.7	6.4	133.4	R 29	4.1
3 1/2	131.8	8.0	14.3	12.7	5.2	8.7	6.4	153.9	R 33	4.1
4	149.2	8.0	14.3	12.7	5.2	8.7	6.4	171.5	R 36	4.1
5	171.5	8.0	14.3	12.7	5.2	8.7	6.4	193.5	R 40	4.1
6	193.7	8.0	14.3	12.7	5.2	8.7	6.4	218.9	R 43	4.1
8	247.7	8.0	14.3	12.7	5.2	8.7	6.4	273.1	R 48	4.1
10	304.8	8.0	14.3	12.7	5.2	8.7	6.4	330.2	R 52	4.1
12	381.0	8.0	14.3	12.7	5.2	8.7	6.4	406.4	R 56	4.1
14	396.9	8.0	14.3	12.7	5.2	8.7	6.4	425.5	R 59	3.0
16	454.0	8.0	14.3	12.7	5.2	8.7	6.4	482.6	R 64	3.0
18	517.5	8.0	14.3	12.7	5.2	8.7	6.4	546.1	R 68	3.0
20	558.8	8.0	14.3	12.7	5.2	8.7	6.4	596.9	R 72	3.0
24	673.1	8.0	14.3	12.7	5.2	8.7	6.4	711.2	R 76	3.0

Notes:

Unless otherwise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details. The depth of groove is added to the minimum flange thickness.

- * Raised face "L" is equal to groove dimension "E" but is not subject to tolerances for "E".
- * A plus tolerance of $\frac{3}{64}$ in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed $\frac{1}{64}$ in, throughout its entire circumference.

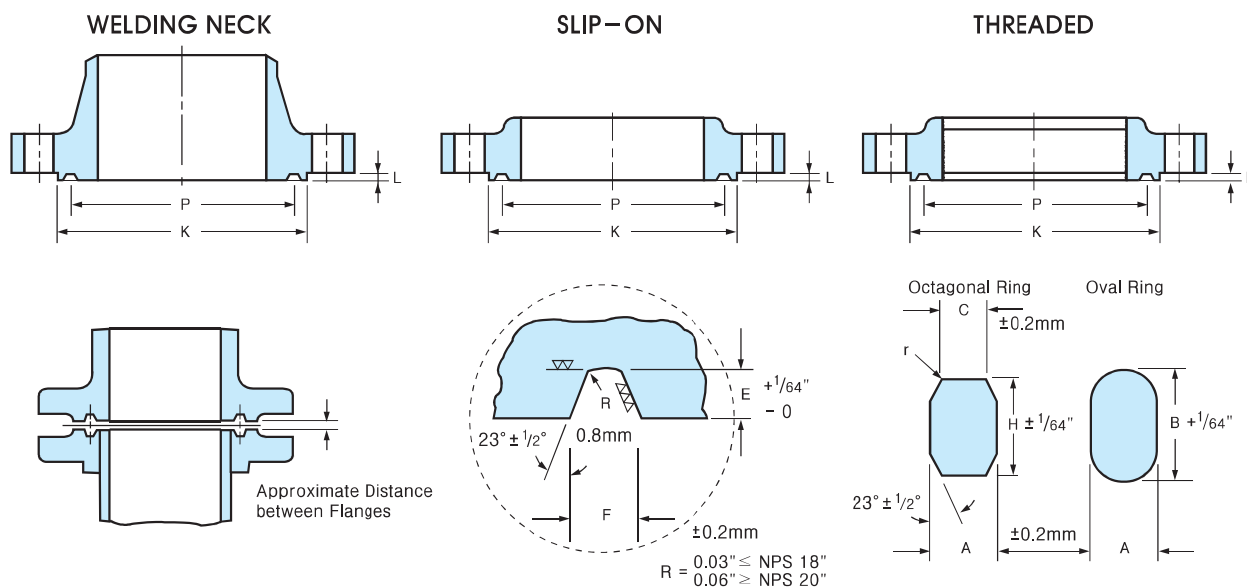
Dimension "R" is max.

Radius "r" is $\frac{1}{16}$ " for ring widths $\frac{7}{8}$ " and less and $\frac{3}{32}$ " for ring widths 1" (25.4mm) and over.



CLASS 300-400-600 FLANGES

RING JOINT FLANGES FACING DIMENSIONS



ANSI B16.5 FORGED FLANGES

Unit: mm

Nominal Pipe Size	Pitch Diam. of Ring and Groove	Width of Ring	HEIGHT OF RING		Width of Flat on Octagonal Rings	Width of Groove	Depth of Groove	Diameter of Raised Face for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges of Ring Joints When Ring is Compressed		
			Oval	Octagonal						Class 300	Class 400	Class 600
	P	A	B	H	C	F	E (L*)	K (Min)				
1/2	34.1	6.4	11.1	9.5	4.3	7.1	5.6	50.8	R 11	3.0	—	3.0
3/4	42.9	8.0	14.3	12.7	5.2	8.7	6.4	63.5	R 13	4.1	—	4.1
1	50.8	8.0	14.3	12.7	5.2	8.7	6.4	69.9	R 16	4.1	—	4.1
1 1/4	60.3	8.0	14.3	12.7	5.2	8.7	6.4	79.5	R 18	4.1	—	4.1
1 1/2	68.3	8.0	14.3	12.7	5.2	8.7	6.4	90.4	R 20	4.1	—	4.1
2	82.6	11.1	17.5	15.9	7.7	11.9	7.9	108.0	R 23	5.6	—	4.8
2 1/2	101.6	11.1	17.5	15.9	7.7	11.9	7.9	127.0	R 26	5.6	—	4.8
3	123.8	11.1	17.5	15.9	7.7	11.9	7.9	146.1	R 31	5.6	—	4.8
3 1/2	131.8	11.1	17.5	15.9	7.7	11.9	7.9	158.8	R 34	5.6	—	4.8
4	149.2	11.1	17.5	15.9	7.7	11.9	7.9	174.8	R 37	5.6	5.6	4.8
5	181.0	11.1	17.5	15.9	7.7	11.9	7.9	209.6	R 41	5.6	5.6	4.8
6	211.2	11.1	17.5	15.9	7.7	11.9	7.9	241.3	R 45	5.6	5.6	4.8
8	269.9	11.1	17.5	15.9	7.7	11.9	7.9	301.8	R 49	5.6	5.6	4.8
10	323.9	11.1	17.5	15.9	7.7	11.9	7.9	355.6	R 53	5.6	5.6	4.8
12	381.0	11.1	17.5	15.9	7.7	11.9	7.9	412.8	R 57	5.6	5.6	4.8
14	419.1	11.1	17.5	15.9	7.7	11.9	7.9	457.2	R 61	5.6	5.6	4.8
16	469.9	11.1	17.5	15.9	7.7	11.9	7.9	508.0	R 65	5.6	5.6	4.8
18	533.4	11.1	17.5	15.9	7.7	11.9	7.9	574.8	R 69	5.6	5.6	4.8
20	584.2	12.7	19.1	17.5	8.7	13.5	9.5	635.0	R 73	5.6	5.6	4.8
24	692.2	15.9	22.2	20.7	10.5	16.7	11.1	749.3	R 77	6.4	6.4	5.6

Notes:

Unless otherwise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details. The depth of groove is added to the minimum flange thickness.

- * Raised face "L" is equal to groove dimension "E" but is not subject to tolerances for "E".
- * A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.

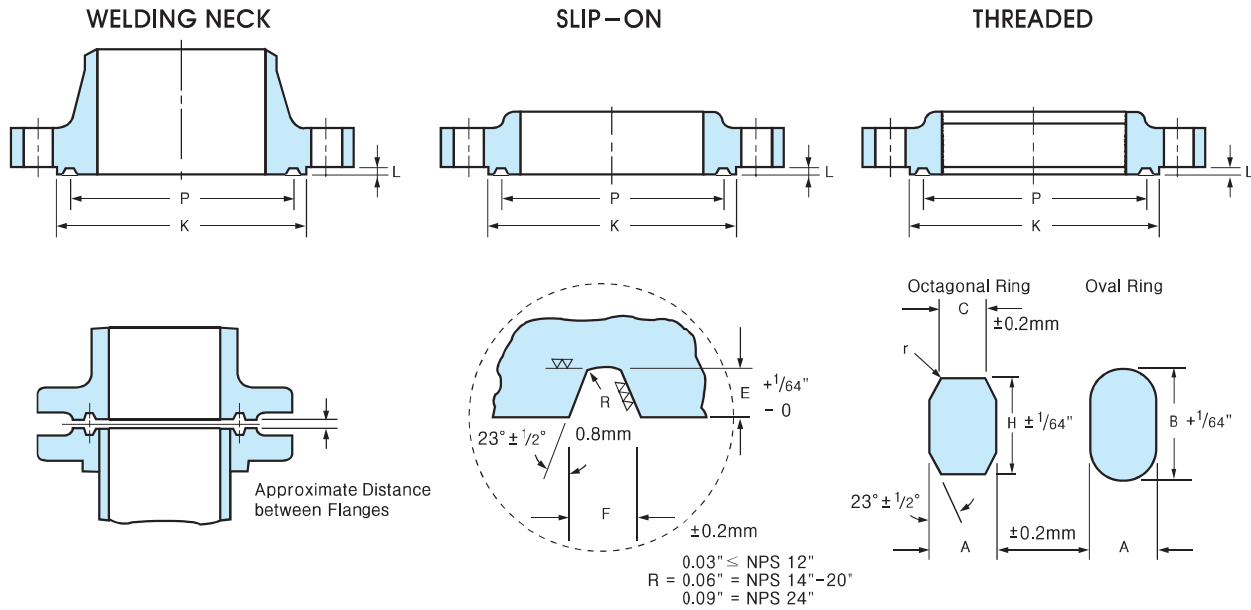
Dimension "R" is max.

Radius "r" is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1" (25.4mm) and over.



CLASS 900 FLANGES

RING JOINT FLANGES FACING DIMENSIONS



Nominal Pipe Size	Pitch Diam. of Ring and Groove	Width of Ring	HEIGHT OF RING		Width of Flat on Octagonal Rings	Width of Groove	Depth of Groove	Diameter of Raised Face for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges of Ring Joints When Ring is Compressed
			Oval	Octagonal						
P	A	B	H	C	F	E (L*)	K (Min)			
For size 2 1/2 and smaller, use Class 1500 Ring Joint Flanges										
3	123.8	11.1	17.5	15.9	7.7	11.9	7.9	155.4	R 31	4.1
4	149.2	11.1	17.5	15.9	7.7	11.9	7.9	180.8	R 37	4.1
5	181.0	11.1	17.5	15.9	7.7	11.9	7.9	215.9	R 41	4.1
6	211.2	11.1	17.5	15.9	7.7	11.9	7.9	241.3	R 45	4.1
8	269.9	11.1	17.5	15.9	7.7	11.9	7.9	307.8	R 49	4.1
10	323.9	11.1	17.5	15.9	7.7	11.9	7.9	362.0	R 53	4.1
12	381.0	11.1	17.5	15.9	7.7	11.9	7.9	419.1	R 57	4.1
14	419.1	15.9	22.2	20.7	10.5	16.7	11.1	466.9	R 62	4.1
16	469.9	15.9	22.2	20.7	10.5	16.7	11.1	523.7	R 66	4.1
18	533.4	19.1	25.4	23.8	11.1	19.8	12.7	593.9	R 70	4.8
20	584.2	19.1	25.4	23.8	12.3	19.8	12.7	647.7	R 74	4.8
24	692.2	25.4	33.4	31.8	17.3	27.0	15.9	771.7	R 78	5.6

Notes:

Unless otherwise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details. The depth of groove is added to the minimum flange thickness.

- * Raised face "L" is equal to groove dimension "E" but is not subject to tolerances for "E".
- * A plus tolerance of $\frac{3}{64}$ in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed $\frac{1}{64}$ in, throughout its entire circumference.

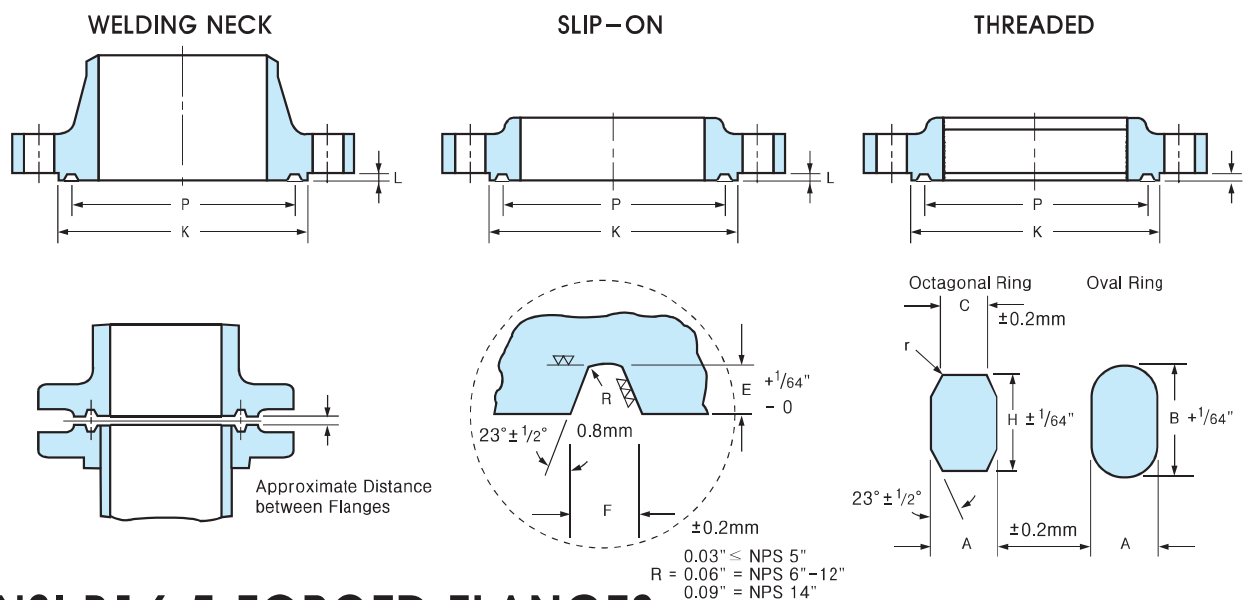
Dimension "R" is max.

Radius "r" is $\frac{1}{16}$ " for ring widths $\frac{7}{8}$ " and less and $\frac{3}{32}$ " for ring widths 1" (25.4mm) and over.



CLASS 1500 FLANGES

RING JOINT FLANGES FACING DIMENSIONS



ANSI B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	Pitch Diam. of Ring and Groove	Width of Ring	HEIGHT OF RING		Width of Flat on Octagonal Rings	Width of Groove	Depth of Groove	Diameter of Raised Face for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges of Ring Joints When Ring is Compressed
			Oval	Octagonal						
	P	A	B	H	C	F	E (L*)	K (Min)		
1/2	39.7	8.0	14.3	12.7	5.2	8.7	6.4	60.5	R 12	4.1
3/4	44.5	8.0	14.3	12.7	5.2	8.7	6.4	66.8	R 14	4.1
1	50.8	8.0	14.3	12.7	5.2	8.7	6.4	71.4	R 16	4.1
1 1/4	60.3	8.0	14.3	12.7	5.2	8.7	6.4	81.0	R 18	4.1
1 1/2	68.3	8.0	14.3	12.7	5.2	8.7	6.4	92.2	R 20	4.1
2	95.3	11.1	17.5	15.9	7.7	11.9	7.9	124.0	R 24	3.0
2 1/2	108.0	11.1	17.5	15.9	7.7	11.9	7.9	136.7	R 27	3.0
3	136.5	11.1	17.5	15.9	7.7	11.9	7.9	168.4	R 35	3.0
4	161.9	11.1	17.5	15.9	7.7	11.9	7.9	193.8	R 39	3.0
5	193.7	11.1	17.5	15.9	7.7	11.9	7.9	228.6	R 44	3.0
6	211.2	12.7	19.1	17.5	8.7	13.5	9.5	247.7	R 46	3.0
8	269.9	15.9	22.2	20.7	10.5	16.7	11.1	317.5	R 50	4.1
10	323.9	15.9	22.2	20.7	10.5	16.7	11.1	371.6	R 54	4.1
12	381.0	22.2	28.6	27.0	14.8	23.0	14.3	438.2	R 58	4.8
14	419.1	25.4	33.4	31.8	17.3	27.0	15.9	489.0	R 63	5.6
16	469.9	28.6	36.5	34.9	19.8	30.2	17.5	546.1	R 67	7.9
18	533.4	28.6	36.5	34.9	19.8	30.2	17.5	612.9	R 71	7.9
20	584.2	31.8	39.7	38.1	22.3	33.4	17.5	673.1	R 75	9.7
24	692.2	34.9	44.5	41.3	24.8	36.5	20.6	793.8	R 79	11.2

Notes:

Unless otherwise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details. The depth of groove is added to the minimum flange thickness.

- * Raised face "L" is equal to groove dimension "E" but is not subject to tolerances for "E".
- * A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.

Dimension "R" is max.

Radius "r" is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1" (25.4mm) and over.

NUTECH OVERSEAS EDITION 11A



Nominal Pipe Size	Pitch Diam. of Ring and Groove	Width of Ring	HEIGHT OF RING		Width of Flat on Octagonal Rings	Width of Groove	Depth of Groove	Diameter of Raised Face for Ring Joint or Lapped	Ring Number	Approximate Distance Between Ranges of Ring Joints When Ring is Compressed
			Oval	Octagonal						
			P	A						
1/2	42.9	8.0	14.3	12.7	5.2	8.7	6.4	65.0	R 13	4.1
3/4	50.8	8.0	14.3	12.7	5.2	8.7	6.4	73.2	R 16	4.1
1	60.3	8.0	14.3	12.7	5.2	8.7	6.4	82.6	R 18	4.1
1 1/4	72.2	11.1	17.5	15.9	7.7	11.9	7.9	101.6	R 21	3.0
1 1/2	82.6	11.1	17.5	15.9	7.7	11.9	7.9	114.3	R 23	3.0
2	101.6	11.1	17.5	15.9	7.7	11.9	7.9	133.4	R 26	3.0
2 1/2	111.1	12.7	19.1	17.5	8.7	13.5	9.5	149.4	R 28	3.0
3	127.0	12.7	19.1	17.5	8.7	13.5	9.5	168.4	R 32	3.0
4	157.2	15.9	22.2	20.7	10.5	16.7	11.1	203.2	R 38	4.1
5	190.5	19.1	25.4	23.8	12.3	19.8	12.7	241.3	R 42	4.1
6	228.6	19.1	25.4	23.8	12.3	19.8	12.7	279.4	R 47	4.1
8	279.4	22.2	28.6	27.0	14.8	23.0	14.3	339.9	R 51	4.8
10	342.9	28.6	36.5	34.9	19.8	30.2	17.5	425.5	R 55	6.4
12	406.4	31.8	39.7	38.1	22.3	33.4	17.5	495.3	R 60	7.9

Radius "r" is $\frac{1}{16}$ " for ring widths $\frac{7}{8}$ " and less and $\frac{3}{32}$ " for ring widths 1" (25.4mm) and over.



REDUCING FLANGES

THREADED AND SLIP-ON TYPES

HUB – For hub diameter (X) and height of hub above the back of the flange (N) refer to the list of standard flange specification of the same type and pressure and use the dimensions of a flange **one nominal pipe size smaller** than the nominal pipe size from which the reduction is being made.

FLANGE O.D., DRILLING TEMPLATE AND THICKNESS – Outside diameter, drilling template and flange thickness Q (see note on FACINGS) agree with the dimensions of a standard flange of the nominal pipe size from which the reduction is being made.

FACING – Facing dimensions also agree with the dimensions of a standard flange of the nominal pipe size from which the reduction is being made.

150 lb. and 300 lb. forged steel Threaded, Slip-On, Welding Neck and Blind flanges are furnished with American Standard 1/16" raised face, which is included in flange thickness. Q. 400 lb., 600 lb., 900 lb., 1500 lb. and 2500 lb. flanges are supplied with American Standard 1/4" raised face which is not included in flange thickness (Q)

BORE OR TAPPING – The bore or tapping is machined to accept a pipe of the nominal pipe size to which the reduction is being made. For reduction to sizes smaller than shown, BLIND FLANGES are tapped or bored to specified nominal pipe size.

EXAMPLE :

A 300 lb. threaded flange used in reducing from a 6" (152.4mm) to 3" (76.2mm) nominal pipe size should be specified as a 3" (76.2mm) × 12 1/2" - 300 lb. Threaded Reducing Flange. It would have the following dimensional characteristics:

Diameter of Hub (X) – 7" (177.8mm).

Height of Hub (N) – 5/8"

Hub dimensions are those of a 5" (127.0mm), 300 lb. Standard flange.

Outside Diameter – 12 1/2"

Thickness (Q) – 1 7/16"

Raised face – 1/16"

O.D., Flange Thickness Q., Raised Face and Drilling Template are those of a 6" (152.4mm), 300 lb. Standard flange.

Tapping – 3" (76.2mm) I. P. S.

Flange is tapped to the nominal pipe size to which reduction is being made.

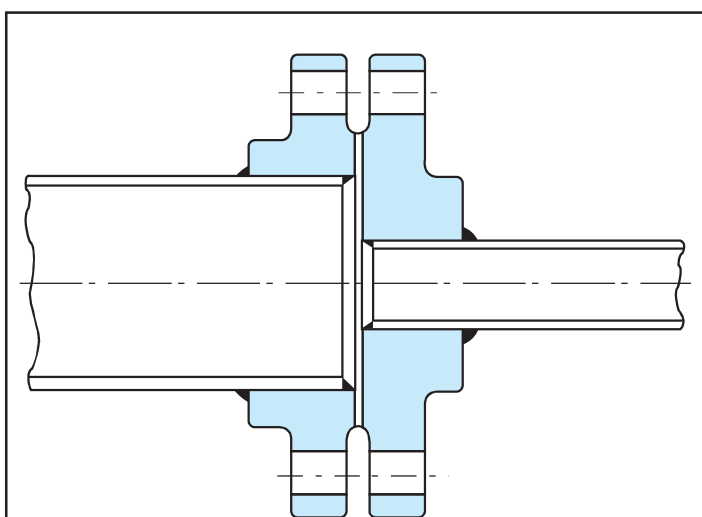
WELDING NECK TYPES

On Reducing Welding Neck Flanges, which are made only on special order, the hub dimensions agree with the hub dimensions of standard flanges of the size to which reduction is being made. Other flange dimensions, including the drilling template, agree with the standard dimensions of the size from which the reduction is being made.



REDUCING FLANGES

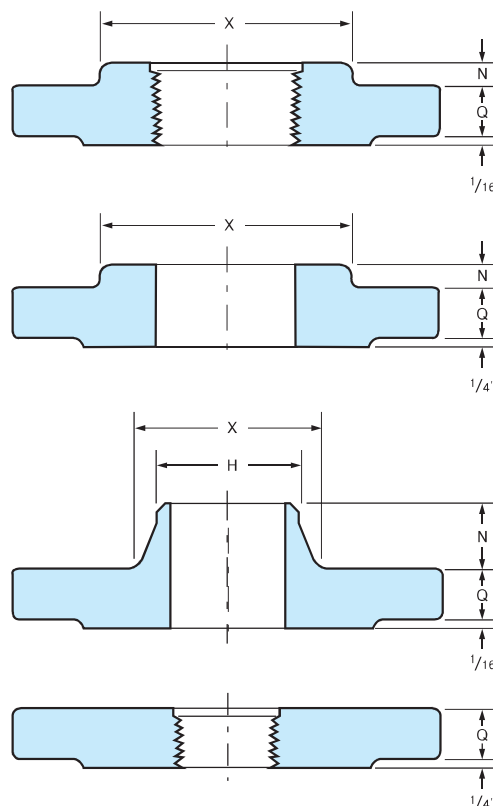
THREADED – SLIP-ON – WELDING NECK



In ordering Reducing Flanges: specify (1) nominal pipe size of the tapping or bore to which the reduction is being made, (2) the outside diameter of the flange from which the reduction is being made and (3) pressure rating.

EXAMPLE :

A 300 lb. Reducing Flange for reducing from a 6" (152.4mm) to 3" (76.2mm) nominal pipe size should be designated as a 3" (76.2mm) × 12 1/2" - 300 lb. Reducing Flange. Whether Threaded, Slip-On, or Welding Neck type is desired must also be specified.



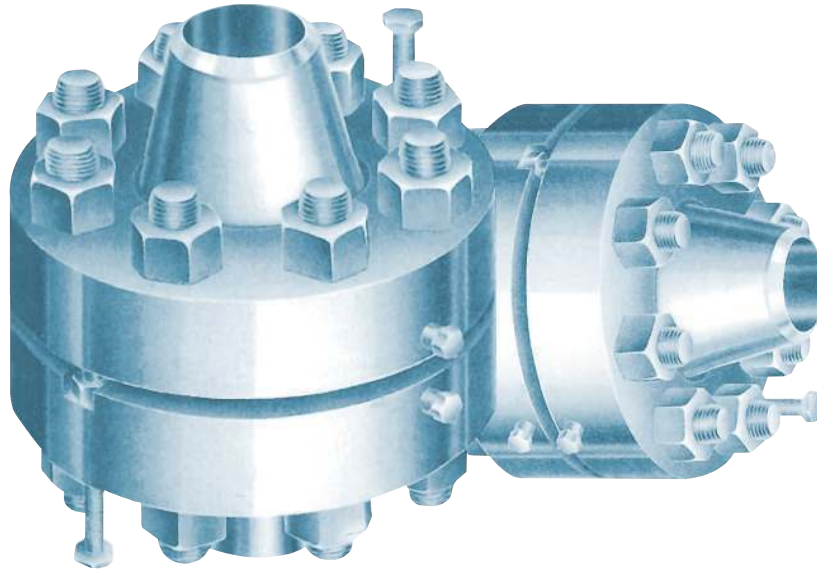
ANSI B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size to Which Reduction is to be Made to be Specified by Purchaser	Nominal Flange	OUTSIDE DIAMETER OF FLANGE FROM WHICH REDUCTION IS BEING MADE							Smallest Size Bore or Tapping Requiring Hub Flange
		150 LB Standard	300 LB Standard	400 LB Standard	600 LB Standard	900 LB Standard	1500 LB Standard	2500 LB Standard	
	3/4	98.4	117.5	117.5	117.5	130.2	130.2	139.7	12.7
	1	108.0	123.8	123.8	123.8	149.2	149.2	158.8	12.7
	1 - 1/4	117.5	133.4	133.4	133.4	158.8	158.8	184.2	12.7
	1 - 1/2	127.0	155.6	155.6	155.6	177.5	177.8	203.2	12.7
	2	152.4	165.1	165.1	165.1	215.9	215.9	235.0	25.4
	2 - 1/2	177.8	190.5	190.5	190.5	244.5	244.5	266.7	31.8
	3	190.5	209.6	209.6	209.6	241.3	266.7	304.8	31.8
	3 - 1/2	215.9	228.6	228.6	228.6	-	-	-	38.1
	4	228.6	254.0	254.0	273.1	292.1	311.2	355.6	38.1
	5	254.0	279.4	279.4	330.2	349.3	374.7	419.1	38.1
	6	279.4	317.5	317.5	355.6	381.0	393.7	482.6	63.5
	8	342.9	381.0	381.0	419.1	469.9	482.6	552.5	76.2
	10	406.4	444.5	444.5	508.0	546.1	584.2	673.1	88.9
	12	482.6	520.7	520.7	558.8	609.6	673.1	762.0	88.9
	14	533.4	584.2	584.2	603.3	641.4	-	-	88.9
	16	596.9	647.7	647.7	685.8	704.9	-	-	101.6
	18	635.0	711.2	711.2	743.0	787.4	-	-	108.0
	20	698.5	774.7	774.7	812.8	857.3	-	-	101.6
	24	812.8	914.4	914.4	939.8	1041.1	-	-	101.6

Notes:

For reductions to sizes smaller than shown, blind flanges are tapped or bored for specified nominal pipe size.



ORIFICE FLANGES

- ANSI ORIFICE FLANGES
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900, 1500 Orifice Flanges
- Class 2500 Orifice Flanges



ANSI ORIFICE FLANGE (ANSI B16.36) FORGED FLANGES

ORIFICE FLANGES are widely used in conjunction with orifice meters for measuring the rate of flow of liquids and gases. They are basically the same as standard welding neck, slip-on and screwed flanges except for the provision of radial, tapped holes in the flange ring for meter connections and additional bolts to act as jack screws to facilitate separating the flanges for inspection or replacement of the orifice plate.

NOTES:

1. JACK SCREW PROVISION

- (1) Each flange shall have a machine bolt mounted in a hole drilled on the flange centerline at 90 deg. from the pressure taps, for use as a jackscrew. Machine bolt shall be regular, with one heavy hex. nut.
- (2) A slot shall be provided in the flange 0.06 in. (1.6mm) wider than the width across flats of the nut. The depth of the slot shall admit the nut so that there is no interference with the joining of the flanges when bolted together without orifice plate.

2. PRESSURE TAPS

- (1) Each orifice flange is provided with two pressure tap holes extending radially from the outside diameter of the flange to the inside diameter of the flange. Corner taps may be used on NPS 1 1/2 and smaller if space permits. Each pressure tap hole shall be equipped with a pipe plug.
- (2) The 0.94 in (23.8mm) locating dimension for raised face and 0.75 in. (19.1mm) for ring joint shall be measured at the bore.
- (3) Each pressure tap hole shall be equipped with a pipe plug.

3. FACING

The finish of Contact Faces Shall Conform To The Requirements Of ASME / ANSI B16.5

4. FLANGE THREADS

- (1) Threaded flanges shall have an American National Standard taper pipe thread conforming to ANSI B2.1.
- (2) The thread shall be concentric with the axis of the flange and variations in alignment shall not exceed 0.06(1.6mm) in. per foot.
- (3) The flanges are made with counterbores at the back of the flange and the threads shall be chamfered to the diameter of the counterbore at an angle of approximately 45 degrees with the axis of the thread to afford easy entrance in making a joint. The chamfer shall be concentric with the thread.
- (4) In order to permit the pipe to be inserted to the face of the flange, the threads should have full root diameters through to the face of the flange, or shall have a counterbore at face of the flange.
- (5) The gaging notch of the working gage shall come flush with the bottom of the chamfer in all threaded flanges and shall be considered as being the intersection of the chamfer cone and the pitch cone of the thread. This depth of chamfer is approximately equal to 1/2 of the pitch of the thread.
- (6) The maximum allowable thread variation is one turn large or small from the gaging notch.

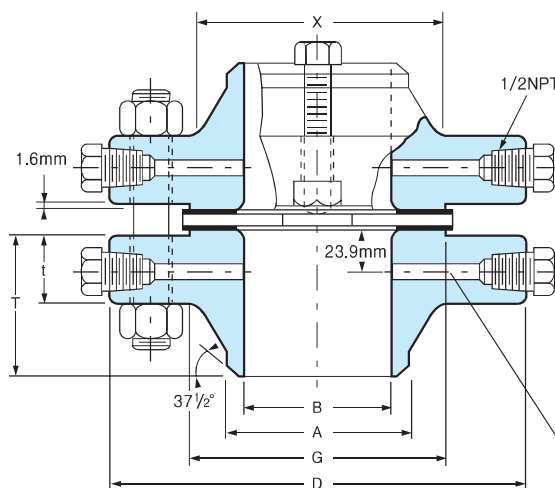
5. TOLERANCES

Tolerances on all dimensions shall be as shown in ANSI B16.5 except for those shown below.

- (1) Tolerance on location of center of pressure tap hole from flange face shall be:
 - a. Flanges smaller than nominal size 4 ± 0.02 in (0.5mm)
 - b. Flanges nominal size 4 and larger ± 0.03 in. (0.8mm)
- (2) Bore diameter tolerance (welding neck flanges only) is $\pm 0.5\%$ of nominal value.

CLASS 300 ORIFICE FLANGES

WELDING NECK (RAISED FACE)



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

ANSI B16.36 FORGED FLANGES

Unit : mm

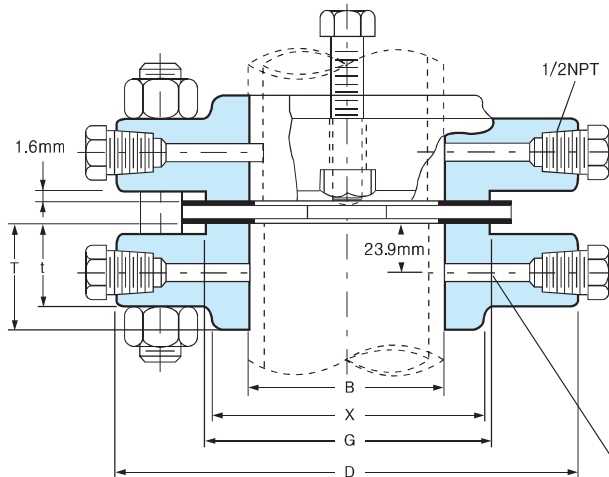
Nominal Pipe Size	Outside Diam. of flange	THICKNESS OF FLANGE (t)	Diam. of Hub at Base	Diam. of Raised Face	Diam. of Hub at Bevel	LENGTH THRU HUB (T)		BORE (B)	
		Raised Face					Welding Neck	Slip-on & Threaded	
	D		X	G	A	Raised Face	Raised Face		
1	124	38.1	53.8	50.8	33.5	82.6	47.8	26.7	34.5
1 1/4	133	38.1	63.5	63.5	42.2	84.1	46.0	35.1	43.2
1 1/2	155	38.1	69.9	73.2	48.3	85.9	47.8	40.9	49.5
2	165	38.1	84.1	91.9	60.5	85.9	49.3	52.6	62.0
2 1/2	191	38.1	100.1	104.6	73.2	88.9	50.8	62.7	74.7
3	210	38.1	117.3	127.0	88.9	88.9	52.3	78.0	90.7
4	254	38.1	146.1	157.2	114.3	91.9	53.8	102.4	116.1
5	279	38.1	177.8	185.7	141.2	101.6	53.8	128.3	143.8
6	318	38.1	206.2	215.9	168.4	100.1	53.8	154.2	170.7
8	381	41.1	260.4	269.7	219.2	111.3	62.0	202.7	221.5
10	445	47.8	320.5	323.9	273.1	117.3	66.5	254.5	276.4
12	521	50.8	374.7	381.0	323.9	130.0	73.2	304.8	327.2
14	584	53.8	425.5	412.8	355.6	142.7	76.2	336.6	359.2
16	648	57.2	482.6	469.9	406.4	146.1	82.6	387.4	410.5
18	711	60.5	533.4	533.4	457.2	158.8	88.9	438.2	461.8
20	775	63.5	587.2	584.2	508.0	162.1	95.3	489.0	513.1
24	914	69.9	701.5	692.2	609.6	168.1	106.4	590.6	616.0

Notes:

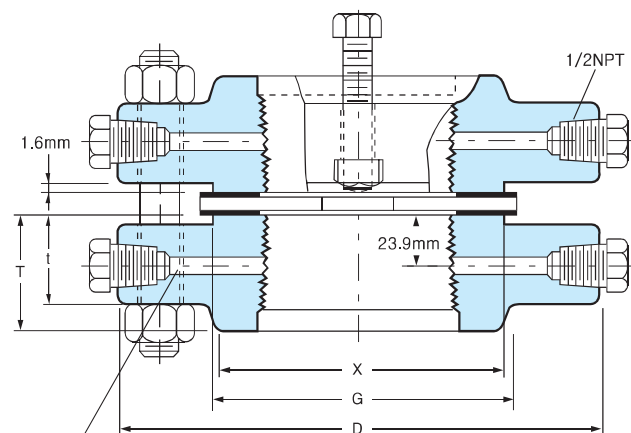
- (1) For the 'Bore' (B) of Welding Neck Flanges other than Standard wall Thickness, refer to page 52.
- (2) Class 300 Welding Neck Flanges of sizes 24" (609.6mm) and smaller will be bored to match Standard Wall Pipe unless otherwise specified.
- (3) Class 300 Orifice flanges will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T).



SLIP-ON



THREADED



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

Unit : mm

Nominal Pipe Size	Pitch Diam. of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT	JACK SCREW SIZE	DRILLING TEMPLATE				
	P		Raised Face	Raised Face	Diam. of Bolt Circle	Number of Bolts	Diam. of Stud Bolts (inch)	Diam. of Bolt Holes	Length of Stud Bolts
									Raised Face
1	50.8	R 16	9.7	Jack screw size for 1" thru 24" are those shown for length and diameter of bolts.	83.9	4	5/8	17.5	139.7
1 1/4	60.3	R 18	9.7		98.6	4	5/8	17.5	152.4
1 1/2	68.3	R 20	12.7		114.3	4	3/4	20.6	152.4
2	82.6	R 23	9.7		127.0	8	5/8	17.5	152.4
2 1/2	101.6	R 26	12.7		149.4	8	3/4	20.6	152.4
3	123.8	R 31	12.7		168.1	8	3/4	20.6	152.4
4	149.2	R 37	12.7		200.2	8	3/4	20.6	152.4
5	181.0	R 41	12.7		235.0	8	3/4	22.4	152.4
6	211.1	R 45	12.7		269.7	12	3/4	22.4	152.4
8	269.9	R 49	15.7		330.2	12	7/8	25.4	158.8
10	323.9	R 53	19.1		387.4	16	1	28.4	165.1
12	381.0	R 57	22.4		450.9	16	1 1/8	31.8	177.8
14	419.1	R 61	22.4		514.4	20	1 1/8	31.8	184.2
16	469.9	R 65	25.4		571.5	20	1 1/4	35.1	196.9
18	533.4	R 69	25.4		628.7	24	1 1/4	35.1	203.2
20	584.2	R 73	25.4		685.8	24	1 1/4	35.1	215.9
24	692.2	R 77	31.8		812.8	24	1 1/2	41.1	241.3

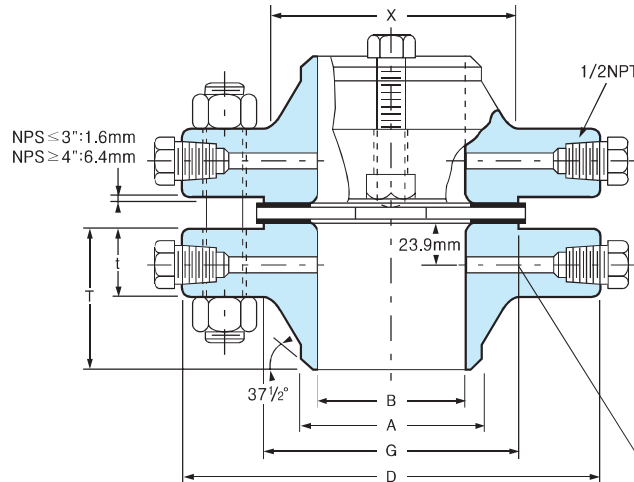
(4) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for NPS 1-12 and 0.38" (9.7mm) for sizes 14-24.

(5) Unless otherwise specified, unions of 1" (25.4mm) thru 24" (609.6mm) furnished with carbon steel regular square headed bolts with semifinished American Standard heavy series hex nuts.



CLASS 400 ORIFICE FLANGES

WELDING NECK (RAISED FACE)



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

ANSI B16.36 FORGED FLANGES

Unit : mm

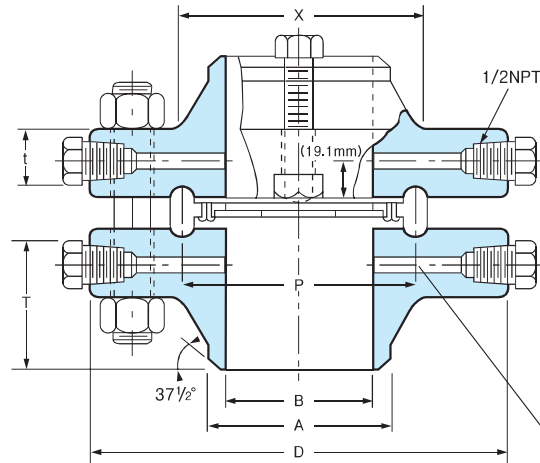
Nominal Pipe Size	Outside Diam. of Flange	THICKNESS OF FLANGE (t)		Diam. of Hub at Base	Diam. of Raised Face	Diam. of Hub at Bevel	LENGTH THRU HUB (T)				BORE (B)	
		Raised Face	Ring Joint				Welding Neck		Slip-on & Threaded		Welding Neck	Slip-on
	D			X	G	A	Raised Face	Ring Joint	Raised Face	Ring Joint		
1	124	38.1	31.8	53.8	50.8	33.5	82.6	76.2	47.8	41.1	See Note(1) To be specified by purchaser	34.5
1 1/4	133	38.1	31.8	63.5	63.5	42.2	84.1	77.7	46.0	39.6		43.2
1 1/2	155	38.1	31.8	69.9	73.2	48.3	85.9	79.2	47.8	41.1		49.5
2	165	38.1	31.8	84.1	91.9	60.5	85.9	79.2	49.3	42.9		62.0
2 1/2	191	38.1	31.8	100.1	104.6	73.2	88.9	82.6	50.8	44.5		74.7
3	210	38.1	31.8	117.3	127.0	88.9	88.9	82.6	52.3	46.0		90.7
4	254	35.1	35.1	146.1	157.2	114.3	88.9	88.9	50.8	50.8		116.1
5	279	38.1	38.1	177.8	185.7	141.2	101.6	101.6	53.8	53.8		143.8
6	318	41.1	41.1	206.2	215.9	168.4	103.1	103.1	57.2	57.2		170.7
8	381	47.8	47.8	260.4	269.7	219.2	117.3	117.3	68.3	68.3		221.5
10	445	53.8	53.8	320.5	323.9	273.1	124.0	124.0	73.2	73.2		276.4
12	521	57.2	57.2	374.7	381.0	323.9	136.7	136.7	79.2	79.2		327.2
14	584	60.7	60.5	425.5	412.8	355.6	149.4	149.4				359.2
16	648	63.5	63.5	482.6	469.9	406.4	152.4	152.4				410.5
18	711	66.5	66.5	533.4	533.4	457.2	165.1	165.1				461.8
20	775	69.9	69.9	587.2	584.2	508.0	168.1	168.1				513.1
24	914	76.2	76.2	701.5	692.2	609.6	174.8	174.8				564.4

Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B_i) of Welding Neck Flanges), refer to page 52.
- (2) Class 400 flanges of sizes 3" and smaller will be furnished with 0.06" (1.6mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T)
The 0.25" (6.35mm) raised face for sizes 4" and larger is not included in (t) and (T)
- (3) Each union includes two carbon steel jack screw bolts with hex nuts.



WELDING NECK (RING-TYPE JOINT)



1/4" Drill for Sizes 2 1/2" and Under
 3/8" Drill for Sizes 3"
 1/2" Drill for Sizes 4" and Over

Unit : mm

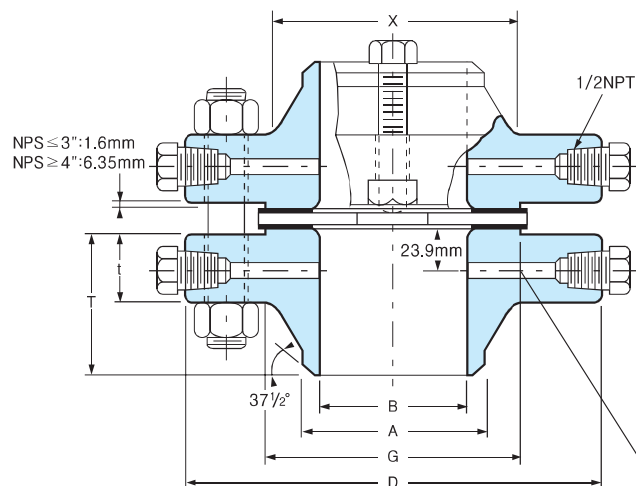
Nominal Pipe Size	Pitch Diam. of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT		JACK SCREW SIZE		DRILLING TEMPLATE					
	Raised Face		Ring Joint	Raised Face (inch)	Ring Joint (inch)	Diam. of Bolt Circle	Number of Bolts	Diam. of Stud Bolts (inch)	Diam. of Bolt Holes	Length of Stud Bolts		
										Raised Face	Ring Joint	
1	50.8	R 16	9.7	6.4	5/8×4.00	5/8×4.75	88.9	4	5/8	17.5	127.0	146.1
1 1/4	60.3	R 18	9.7	6.4	5/8×4.00	5/8×4.75	98.6	4	5/8	17.5	127.0	120.7
1 1/2	68.3	R 20	12.7	6.4	3/4×4.25	3/4×5.00	114.3	4	3/4	21.0	133.4	152.4
2	82.6	R 23	9.7	6.4	5/8×4.00	5/8×4.75	127.0	8	5/8	17.5	127.0	152.4
2 1/2	101.6	R 26	12.7	6.4	3/4×4.25	3/4×5.00	149.4	8	3/4	20.6	133.4	158.8
3	123.8	R 31	12.7	6.4	3/4×4.25	3/4×5.00	168.1	8	3/4	20.6	133.4	158.8
4	149.2	R 37	6.4	15.7	3/4×3.00	3/4×4.00	200.2	8	7/8	25.4	139.7	152.4
5	181.0	R 41	6.4	15.7	3/4×3.00	3/4×4.00	235.0	8	7/8	25.4	146.1	158.8
6	211.1	R 45	12.7	22.4	1×3.50	1×4.00	269.7	12	7/8	25.4	158.8	165.1
8	269.9	R 49	12.7	22.4	1×3.50	1×4.50	330.2	12	1	28.4	171.5	184.2
10	323.9	R 53	12.7	22.4	1×4.00	1×4.50	387.4	16	1 1/8	31.8	190.5	203.2
12	381.0	R 57	12.7	22.4	1×4.00	1×5.00	450.9	16	1 1/4	35.1	203.2	215.9
14	419.1	R 61	12.7	22.4	1×4.25	1×5.00	514.4	20	1 1/4	35.1	209.6	228.6
16	469.9	R 65	12.7	22.4	1×4.25	1×5.00	571.5	20	1 3/8	38.1	222.3	235.0
18	533.4	R 69	12.7	22.4	1×4.50	1×5.00	628.7	24	1 3/8	38.1	235.0	241.3
20	584.2	R 73	12.7	22.4	1×4.75	1×5.50	685.8	24	1 1/2	41.1	247.7	260.4
24	692.2	R 77	12.7	22.4	1×5.00	1×6.00	812.8	24	1 3/4	47.8	279.4	285.8

- (4) Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- (5) On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm) When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.
- (6) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 4-12 and 0.38" (9.7mm) for sizes 14-24 Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 4-10, 0.75" (19.1mm) for sizes 12-18 and 0.88" (22.4mm) for size 20.



CLASS 600 ORIFICE FLANGES

WELDING NECK (RAISED FACE)



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

ANSI B16.36 FORGED FLANGES

Unit : mm

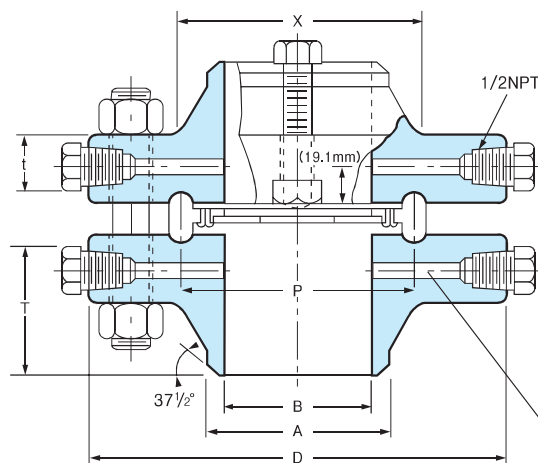
Nominal Pipe Size	Outside Diam. of Flange	THICKNESS OF FLANGE (t)		Diam. of Hub at Base	Diam. of Raised Face	Diam. of Hub at Bevel	LENGTH THRU HUB (T)				BORE (B)	
		Raised Face	Ring Joint				Welding Neck		Slip-on & Threaded		Welding Neck	Slip-on
	D			X	G	A	Raised Face	Ring Joint	Raised Face	Ring Joint		
1	124	38.1	31.8	53.8	50.8	33.5	82.6	76.2	47.8	41.1	See Note(1) To be specified by purchaser	34.5
1 1/4	133	38.1	31.8	63.5	63.5	42.2	84.1	77.7	46.0	39.6		43.2
1 1/2	155	38.1	31.8	69.9	73.2	48.3	85.9	79.2	47.8	41.1		49.5
2	165	38.1	31.8	84.1	91.9	60.5	85.9	79.2	49.3	42.9		62.0
2 1/2	191	38.1	31.8	100.1	104.6	73.2	88.9	82.6	50.8	44.5		74.7
3	210	38.1	31.8	117.3	127.0	88.9	88.9	82.6	52.3	46.0		90.7
4	273	38.1	38.1	152.4	157.2	114.3	101.6	101.6	53.8	53.8		116.1
5	330	44.5	44.5	189.0	185.7	141.2	114.3	114.3	60.5	60.5		143.8
6	356	47.8	47.8	222.3	215.9	168.4	117.3	117.3	66.5	66.5		170.7
8	419	55.6	55.6	273.1	269.7	219.2	133.4	133.4	76.2	76.2		221.5
10	508	63.5	63.5	342.9	323.9	273.1	152.4	152.4	85.9	85.9		276.4
12	559	66.5	66.5	400.1	381.0	323.9	155.4	155.4	91.9	91.9		327.2
14	603	69.9	69.9	431.8	412.8	355.6	165.1	165.1				
16	686	76.2	76.2	495.3	469.9	406.4	177.8	177.8				
18	743	82.6	82.6	546.1	533.4	457.2	184.2	184.2				
20	813	88.9	88.9	609.6	584.2	508.0	190.5	190.5				
24	940	101.6	101.6	717.6	692.2	609.6	203.2	203.2				

Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 600 flanges of sizes 3" and smaller will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T)
The 0.25" (6.4mm) raised face for sizes 4" and larger is not included in (t) and (T)
- (3) Each union includes two carbon steel jack screw bolts with hex nuts.



WELDING NECK (RING-TYPE JOINT)



1/4" Drill for Sizes 2 1/2" and Under
 3/8" Drill for Sizes 3"
 1/2" Drill for Sizes 4" and Over

Unit : mm

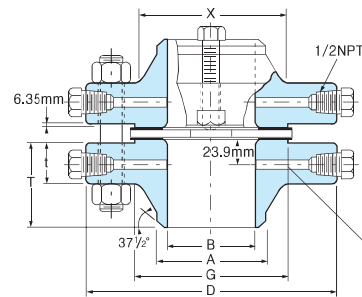
Nominal Pipe Size	Pitch Diam. of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT		JACK SCREW SIZE		DRILLING TEMPLATE						
	Raised Face		Ring Joint	Raised Face (inch)	Ring Joint (inch)	Diam. of Bolt Circle	Number of Bolts	Diam. of Stud Bolts (inch)	Diam. of Bolt Holes		Length of Stud Bolts		
									RF	RTJ	Raised Face	Ring Joint	
1	50.8	R 16	9.7	6.4	5/8×4.00	5/8×4.75	88.9	4	5/8	17.5	19.1	127.0	146.1
1 1/4	60.3	R 18	9.7	6.4	5/8×4.00	5/8×4.75	98.6	4	5/8	17.5	—	127.0	146.1
1 1/2	68.3	R 20	12.7	6.4	3/4×4.25	3/4×5.00	114.3	4	3/4	21.0	22.4	133.4	152.4
2	82.6	R 23	9.7	6.4	5/8×4.00	5/8×4.75	127.0	8	5/8	17.5	19.7	127.0	152.4
2 1/2	101.6	R 26	12.7	6.4	3/4×4.25	3/4×5.00	149.4	8	3/4	20.6	22.4	133.4	158.8
3	123.8	R 31	12.7	6.4	3/4×4.25	3/4×5.00	168.1	8	3/4	20.6	22.4	133.4	158.8
4	149.2	R 37	6.4	15.7	3/4×3.00	3/4×4.00	215.9	8	7/8	25.4	25.4	152.4	165.1
5	181.0	R 41	6.4	15.7	3/4×3.00	3/4×4.00	266.7	8	1	28.4	28.4	139.7	177.8
6	211.1	R 45	12.7	22.4	1×3.50	1×4.00	292.1	12	1	28.4	28.4	177.8	190.5
8	269.9	R 49	12.7	22.4	1×3.50	1×4.50	349.3	12	1 1/8	31.8	31.8	196.9	209.6
10	323.9	R 53	12.7	22.4	1×4.00	1×4.50	431.8	16	1 1/4	35.1	35.1	222.3	235.0
12	381.0	R 57	12.7	22.4	1×4.00	1×5.00	489.0	16	1 1/4	35.1	35.1	228.6	241.3
14	419.1	R 61	12.7	22.4	1×4.25	1×5.00	527.1	20	1 3/8	38.1	38.1	241.3	254.0
16	469.9	R 65	12.7	22.4	1×4.25	1×5.00	603.3	20	1 1/2	41.1	41.1	260.4	273.1
18	533.4	R 69	12.7	22.4	1×4.50	1×5.00	654.1	24	1 5/8	44.5	44.5	279.4	292.1
20	584.2	R 73	12.7	22.4	1×4.75	1×5.50	723.9	24	1 5/8	44.5	44.5	298.5	317.5
24	692.2	R 77	12.7	22.4	1×5.00	1×6.00	838.2	24	1 7/8	50.8	50.8	336.6	342.9

- (4) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 1–12 and 0.38" (9.7mm) for sizes 14–24 Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 1–10, 0.75" (19.1mm) for sizes 12–18 and 0.88" (22.4mm) for size 20.
- (5) Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- (6) On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm) When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.



NUTECH OVERSEAS

WELDING NECK
(RAISED FACE)



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

ANSI B16.36 FORGED FLANGES

Unit : mm

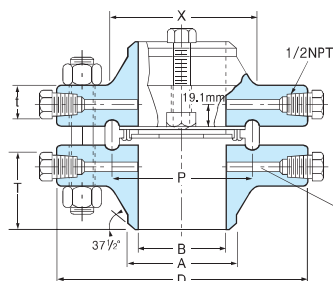
Nominal Pipe Size	Outside Diam. of Flange	THICKNESS OF FLANGE (t)		Diam. of Hub at Base	Diam. of Raised Face	Diam. of Hub at Bevel	LENGTH THRU HUB (T)				BORE (B)	
		Raised Face	Ring Joint				Welding Neck		Slip-on & Threaded		Welding Neck	Slip-on
	D			X	G	A	Raised Face	Ring Joint	Raised Face	Ring Joint		
CLASS 900												
3	241	38.1	38.1	127.0	127.0	88.9	101.6	101.6	53.8	53.8	To be specified by purchaser	90.7
4	292	44.5	44.5	158.8	157.2	114.3	114.3	114.3	69.9	69.9		116.1
5	349	50.8	50.8	190.5	185.7	141.2	127.0	127.0	79.2	79.2		143.8
6	381	55.6	55.6	235.0	215.9	168.4	139.7	139.7	85.9	85.9		170.7
8	470	63.5	63.5	298.5	269.7	219.2	162.1	162.1	101.6	101.6		221.5
10	546	69.9	69.9	368.3	323.9	273.1	184.2	184.2	108.0	108.0		276.4
12	610	79.2	79.2	419.1	381.0	323.9	200.2	200.2	117.3	117.3		327.2
14	641	85.9		450.9	412.8	355.6	212.9					
16	705	88.9		508.0	469.9	406.4	215.9					
18	787	101.6		565.2	533.4	457.2	228.6					
20	857	108.0		622.3	584.2	508.0	247.7					
24	1041	139.7		749.3	692.2	609.6	292.1					
CLASS 1500												
1	149	38.1	38.1	52.3	50.8	33.5	82.6	82.6	47.8	44.5	To be specified by purchaser	34.5
1 1/4	159	35.1	35.1	63.5	63.5	42.2	73.2	73.2	47.8	44.5		43.2
1 1/2	178	38.1	38.1	69.9	73.2	48.3	88.9	88.9	47.8	44.5		49.5
2	216	38.1	38.1	104.6	91.9	60.5	101.6	101.6	57.2	57.2		62.0
2 1/2	244	41.1	41.1	124.0	104.6	73.2	104.6	104.6	63.5	63.5		74.7
3	267	47.8	47.8	133.4	127.0	88.9	117.3	117.3	73.2	73.2		90.7
4	311	53.8	53.8	162.1	157.2	114.3	124.0	124.0	90.4	90.4		116.1
5	375	73.2	73.2	196.9	185.7	141.2	155.4	104.6	104.6	104.6		143.8
6	394	82.6	82.6	228.6	215.9	168.4	171.5	171.5	119.1	119.1		170.7
8	483	92.0	92.0	292.1	269.7	219.2	212.9	212.9	142.7	142.7		221.5
10	584	108.0	108.0	368.3	323.9	273.1	254.0	254.0	158.8	158.8		276.4
12	673	124.0	124.0	450.9	381.0	323.9	282.4	282.4	180.8	180.8		327.2
14	749	133.4		495.3	412.8	355.6	298.5					
16	826	146.1		552.5	469.9	406.4	311.2					
18	914	162.1		596.9	533.4	457.2	327.2					
20	984	177.8		641.4	584.2	508.0	355.6					
24	1168	203.2		762.0	692.2	609.6	406.4					

Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B_i) of Welding Neck Flanges), refer to page 52.
- (2) Class 900 dimensions of sizes 1" (25.4mm) through 2 1/2" are the same as for Class 1500.
- (3) Class 900 and 1500 is not included in 'thickness' (t) and 'Length through Hub' (T).
- (4) Each union includes two carbon steel jack screw bolts with hex nuts.



WELDING NECK (RING-TYPE JOINT)



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

Unit : mm

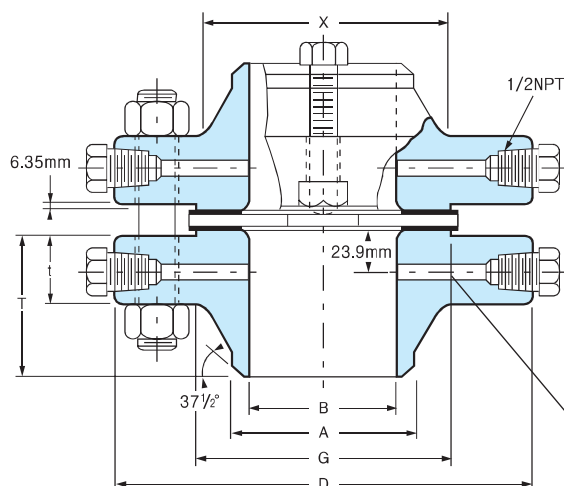
Nominal Pipe Size	Pitch Diam. of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT		JACK SCREW SIZE		DRILLING TEMPLATE					
	P		Raised Face	Ring Joint	Raised Face (inch)	Ring Joint (inch)	Diam. of Bolt Circle	Number of Bolts	Diam. of Stud Bolts (inch)	Diam. of Bolt Holes	Length of Stud Bolts	
											Raised Face	Ring Joint
CLASS 900												
3	123.8	R 31	9.7	15.7	3/4×3.50	3/4×4.00	190.5	8	7/8	25.4	152.4	165.1
4	149.2	R 37	9.7	15.7	3/4×3.50	3/4×4.50	235.0	8	1 1/8	31.8	177.8	190.5
5	181.0	R 41	9.7	15.7	3/4×3.50	3/4×4.50	279.4	8	1 1/4	35.1	190.5	203.2
6	211.1	R 45	15.7	22.4	1×4.50	1×4.75	317.5	12	1 1/8	31.8	196.9	209.6
8	269.9	R 49	15.7	22.4	1×4.50	1×5.00	393.7	12	1 3/8	38.1	228.6	241.3
10	323.9	R 53	15.7	22.4	1×4.50	1×5.25	469.9	16	1 3/8	38.1	241.3	254.0
12	381.0	R 57	15.7	22.4	1×4.50	1×5.50	533.4	20	1 3/8	38.1	260.4	273.1
14							558.8	20	1 1/2	41.1	279.4	
16							616.0	20	1 5/8	44.5	292.1	
18							685.8	20	1 7/8	50.8	330.2	
20							749.3	20	2	53.8	355.6	
24							901.7	20	2 1/2	66.5	444.5	
CLASS 1500												
1	50.8	R 16	6.4	12.7	5/8×3.00	5/8×3.50	101.6	4	7/8	25.4	152.4	158.8
1 1/4	60.3	R 18	6.4	12.7	5/8×3.00	5/8×3.50	111.3	4	7/8	25.4	139.7	146.1
1 1/2	68.3	R 20	6.4	12.7	5/8×3.00	5/8×3.50	124.0	4	1	28.4	158.8	165.1
2	95.3	R 24	6.4	12.7	5/8×3.00	5/8×4.00	165.1	8	7/8	25.4	152.4	165.1
2 1/2	108.0	R 27	6.4	12.7	5/8×3.00	5/8×4.00	190.5	8	1	28.4	165.1	177.8
3	136.5	R 35	9.7	15.7	5/8×3.50	3/4×4.50	203.2	8	1 1/8	31.8	184.2	196.9
4	161.9	R 39	9.7	15.7	3/4×3.50	3/4×4.50	241.3	8	1 1/4	35.1	203.2	215.9
5	193.7	R 44	9.7	15.7	3/4×3.50	3/4×4.50	292.1	8	1 1/2	41.1	247.7	260.4
6	211.1	R 46	15.8	22.4	1×6.00	1×6.50	317.5	12	1 3/8	38.1	266.7	279.4
8	269.9	R 50	15.7	22.4	1×6.50	1×6.50	393.7	12	1 5/8	44.5	298.5	317.5
10	323.9	R 54	15.7	22.4	1×6.50	1×7.00	482.6	12	1 7/8	50.8	342.9	362.0
12	381.0	R 58	15.7	22.4	1×6.50	1×8.00	571.5	16	2	53.8	381.0	406.4
14							635.0	16	2 1/4	60.5	412.8	
16							704.9	16	2 1/2	66.5	450.9	
18							774.7	16	2 3/4	73.2	501.7	
20							831.9	16	3	79.2	546.1	
24							990.6	16	3 1/2	91.9	622.3	

- Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm) When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 3-12 and 0.38" (9.7mm) for sizes 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 3-10, And 0.75" (19.1mm) for sizes 12.

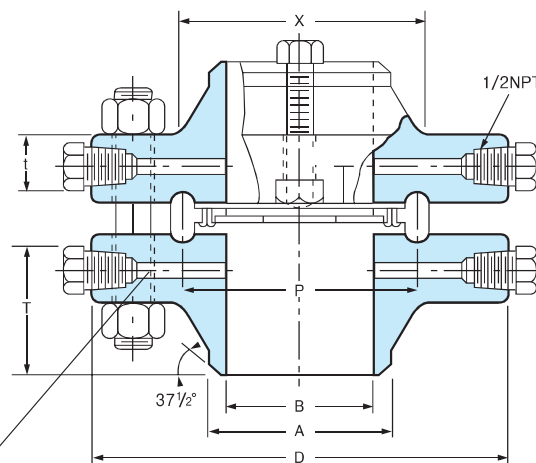


CLASS 2500 ORIFICE FLANGES

WELDING NECK (RAISED FACE)



WELDING NECK (RING-TYPE JOINT)



1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

ANSI B16.36 FORGED FLANGES

Unit : mm

Nominal Pipe Size	O.D. of Flange Face	O.D. of Raised Flange	THK' S of Hub Min	Length Thru	Diam of Hub	Diam of Hub at Bevel	Bore	Ring Type Joint	Ring Number	DRILLING TEMPLATE				LENGTH OF STUD BOLTS	
	D	G	t	T	X	A	B	Pitch Diam.		Diam. Bolt Circle	Number of Holes	Diam. of Holes	Diam. of Bolt (inch)	Raised Face	Ring Joint
1	159	50.8	38.1	91.9	57.2	33.5	See Note(1) To be specified by purchaser	60.3	R 18	108.0	4	25.4	7/8	152.4	158.8
1 1/2	203	73.2	44.5	111.3	79.2	48.3		82.6	R 23	146.1	4	31.8	1 1/8	177.8	190.5
2	235	91.9	50.8	127.0	95.3	60.5		101.6	R 26	171.5	8	28.4	1	184.2	196.9
2 1/2	267	104.6	57.2	142.7	114.3	73.2		111.1	R 28	196.9	8	31.8	1 1/8	203.2	215.9
3	305	127.0	66.5	168.1	133.4	88.9		127.0	R 32	228.6	8	35.1	1 1/4	228.6	241.3
4	356	157.2	76.2	190.5	165.1	114.3				273.1	8	41.1	1 1/2	260.4	
6	483	215.9	108.0	273.1	235.0	168.4				368.3	8	53.8	2	349.3	
8	552	269.7	127.0	317.5	304.8	219.2				438.2	12	53.8	2	387.4	
10	673	323.9	165.1	419.1	374.7	273.1				539.8	12	66.5	2 1/2	489.0	
12	762	381.0	184.2	463.6	441.5	323.9				619.3	12	73.2	2 3/4	539.8	

Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B_i) of Welding Neck Flanges), refer to page 52.
- (2) Class 2500 flanges will be furnished with 0.25" (6.4mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T)
- (3) Each union includes two carbon steel jack screw bolts with hex nuts.
- (4) Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- (5) On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm) When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.
- (6) Class 2500 Slip-on flanges are not covered by B16.5.
- (7) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 1-12 and 0.38" (9.7mm) for sizes 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 1-6.

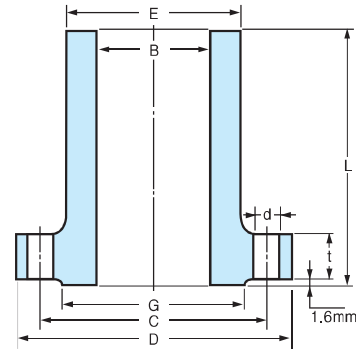


LONG WELDING NECKS FLANGES

- Class 150 Flanges
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges



CLASS 150 FLANGES LONG WELDING NECK



Unit : mm

Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Diameter of Bore	Thickness of Flange Min.	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	B	t	L	C		d
1/2	89	30.2	35.1	12.7	11.2	228.6	60.5	4	15.7
3/4	99	38.1	42.9	19.1	12.7	228.6	69.9	4	15.7
1	108	50.8	50.8	25.4	14.2	228.6	79.2	4	15.7
1 1/4	117	60.5	63.5	31.8	15.7	228.6	88.9	4	15.7
1 1/2	127	66.5	73.2	38.1	17.5	228.6	98.6	4	15.7
2	152	82.6	91.9	50.8	19.1	228.6	120.7	4	19.1
2 1/2	178	95.3	104.6	63.5	22.4	228.6	139.7	4	19.1
3	191	108.0	127.0	76.2	23.9	228.6	152.4	4	19.1
3 1/2	216	124.0	139.7	88.9	23.9	228.6	177.8	8	19.1
4	229	139.7	157.2	101.6	23.9	304.8	190.5	8	19.1
5	254	165.1	185.7	127.0	23.9	304.8	215.9	8	22.4
6	279	196.9	215.9	152.4	25.4	304.8	241.3	8	22.4
8	343	247.7	269.7	203.2	28.4	304.8	298.5	8	22.4
10	406	304.8	323.9	254.0	30.2	304.8	362.0	12	25.4
12	483	365.3	381.0	304.8	31.8	304.8	431.8	12	25.4
14	533	406.4	412.8	355.6	35.1	304.8	476.3	12	28.4
16	597	457.2	469.9	406.4	36.6	304.8	539.8	16	28.4
18	635	508.0	533.4	457.2	39.6	304.8	577.9	16	31.8
20	699	558.8	584.2	508.0	42.9	304.8	635.0	20	31.8
24	813	666.8	692.2	609.6	47.8	304.8	749.3	20	35.1

CLASS 300 FLANGES LONG WELDING NECK

Unit : mm

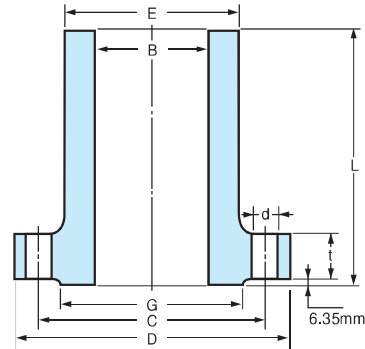
Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Thickness of Flange Min.	Diameter of Bore	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	t	B	L	C		d
1/2	95	38.1	35.1	14.2	12.7	228.6	66.5	4	15.7
3/4	117	47.8	42.9	15.7	19.1	228.6	82.6	4	19.1
1	124	53.8	50.8	17.5	25.4	228.6	88.9	4	19.1
1 1/4	133	63.5	63.5	19.1	31.8	228.6	98.6	4	19.1
1 1/2	155	69.9	73.2	20.6	38.1	228.6	114.3	4	22.4
2	165	84.1	91.9	22.4	50.8	228.6	127.0	8	19.1
2 1/2	191	100.1	104.6	25.4	63.5	228.6	149.4	8	22.4
3	210	117.3	127.0	28.4	76.2	228.6	168.1	8	22.4
3 1/2	229	133.4	139.7	30.2	88.9	228.6	184.2	8	22.4
4	254	146.1	157.2	31.8	101.6	304.8	200.2	8	22.4
5	279	177.8	185.7	35.1	127.0	304.8	235.0	8	22.4
6	318	206.2	215.9	36.6	152.4	304.8	269.7	12	22.4
8	381	260.4	269.7	41.1	203.2	304.8	330.2	12	25.4
10	445	320.5	323.9	47.8	254.0	304.8	387.4	16	28.4
12	521	374.7	381.0	50.8	304.8	304.8	450.9	16	31.8
14	584	425.5	412.8	53.8	355.6	304.8	514.4	20	31.8
16	648	482.6	469.9	57.2	406.4	304.8	571.5	20	35.1
18	711	533.4	533.4	60.5	457.2	304.8	628.7	24	35.1
20	775	587.2	584.2	63.5	508.0	304.8	685.8	24	35.1
24	914	701.5	692.2	69.9	609.6	304.8	812.8	24	41.1

Notes:

- (1) Bore (B) is the same as nominal pipe size.
- (2) Welding necks longer than listed are available in all sizes on special order.



CLASS 400 FLANGES LONG WELDING NECK



Unit : mm

Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Diameter of Bore	Thickness of Flange Min.	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	B	↑	L	C		d
1 1 1/4 1 1/2 2 2 1/2 3 3 1/2	Use Class 600 dimensions in these sizes.								
4	254	146.1	157.2	101.6	35.1	304.8	200.2	8	25.4
5	279	177.8	185.7	127.0	38.1	304.8	235.0	2	25.4
6	318	206.2	215.9	152.4	41.1	304.8	269.7	12	25.4
8	381	260.4	269.7	203.2	47.8	304.8	330.2	12	28.4
10	445	320.5	323.9	254.0	53.8	304.8	387.4	16	31.8
12	521	374.7	381.0	304.8	57.2	304.8	450.9	16	35.1
14	584	425.5	412.8	355.6	60.5	304.8	514.4	20	35.1
16	648	482.6	469.9	406.4	63.5	304.8	571.5	24	38.1
18	711	533.4	533.4	457.2	66.5	304.8	628.7	24	38.1
20	775	587.2	584.2	508.0	69.9	304.8	685.8	24	41.1
24	914	701.5	692.2	609.6	76.2	304.8	812.8	24	47.8

CLASS 600 FLANGES LONG WELDING NECK

Unit : mm

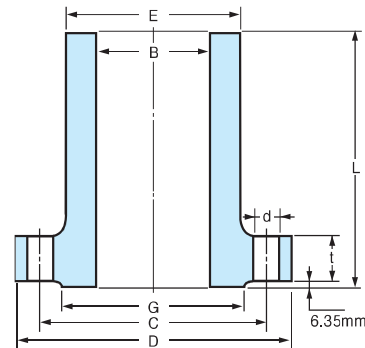
Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Diameter of Bore	Thickness of Flange Min.	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	B	↑	L	C		d
1 1 1/4 1 1/2	124 133 155	53.8 63.5 69.9	50.8 63.5 73.2	25.4 31.8 38.1	17.5 20.6 22.4	228.6 228.6 228.6	88.9 98.6 114.3	4 4 4	19.1 19.1 22.4
2 2 1/2 3 3 1/2 4	165 191 210 229 273	84.1 100.1 117.3 133.4 152.4	91.9 104.6 127.0 139.7 157.2	50.8 63.5 76.2 88.9 101.6	25.4 28.4 31.8 35.1 38.1	228.6 228.6 228.6 228.6 304.8	127.0 149.4 168.1 184.2 215.9	8 8 8 8 8	19.1 22.4 22.4 25.4 25.4
5 6 8 10 12	330 356 419 508 559	190.5 222.3 273.1 342.9 400.1	185.7 215.9 269.7 323.9 381.0	127.0 152.4 203.2 254.0 304.8	44.5 47.8 55.6 63.5 66.5	304.8 304.8 304.8 304.8 304.8	266.7 292.1 349.3 431.8 489.0	8 12 12 16 20	28.4 28.4 31.8 35.1 35.1
14 16 18 20 24	603 686 743 813 940	431.8 495.3 546.1 609.6 717.6	412.8 469.9 533.4 584.2 692.2	355.6 406.4 457.2 508.0 609.6	69.9 76.2 82.6 88.9 101.6	304.8 304.8 304.8 304.8 304.8	527.1 603.3 654.1 723.9 838.2	20 20 20 24 24	38.1 41.1 44.5 44.5 50.8

Notes:

- (1) Bore (B) is the same as nominal pipe size.
- (2) Welding necks longer than listed are available in all sizes on special order.



CLASS 900 FLANGES LONG WELDING NECK



Unit : mm

Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Diameter of Bore	Thickness of Flange Min.	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	B	I	L	C		d
1 1 1/4 1 1/2	Use Class 1500 dimensions in these sizes.								
2 2 1/2									
3									
4	241	127.0	127.0	76.2	38.1	304.8	190.5	8	25.4
5	292	158.8	157.2	101.6	44.5	304.8	235.0	8	31.8
6	349	190.5	185.7	127.0	50.8	304.8	279.4	8	35.1
8	381	235.0	215.9	152.4	55.6	304.8	317.5	12	31.8
10	470	298.5	269.7	203.2	63.5	304.8	393.7	12	38.1
12	546	368.3	323.9	254.0	69.9	406.4	469.9	16	38.1
14	610	419.1	381.0	304.8	79.2	406.4	533.4	20	38.1
16	641	450.9	412.8	355.6	85.9	To be Specified by Purchaser.	558.8	20	41.1
18	705	508.0	469.9	406.4	88.9		616.0	20	44.5
20	787	565.2	533.4	457.2	101.6		685.8	20	50.8
24	857	622.3	584.2	508.0	108.0		749.3	20	53.8
24	1041	749.3	692.2	609.6	139.7		901.7	20	66.5

CLASS 1500 FLANGES LONG WELDING NECK

Unit : mm

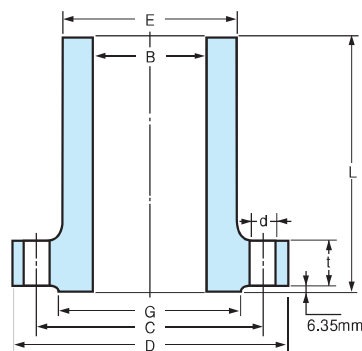
Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Diameter of Bore	Thickness of Flange Min.	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	B	I	L	C		d
1	149	52.3	50.8	25.4	25.4	228.6	101.6	4	25.4
1 1/4	159	63.5	63.5	31.8	28.4	228.6	111.3	4	25.4
1 1/2	178	69.9	73.2	38.1	31.8	228.6	124.0	4	28.4
2	216	104.6	91.9	50.8	38.1	228.6	165.1	8	25.4
2 1/2	244	124.0	104.6	63.5	41.1	304.8	190.5	8	28.4
3	267	133.4	127.0	76.2	47.8	304.8	203.2	8	31.8
4	311	162.1	157.2	101.6	53.8	304.8	241.3	8	35.1
5	375	196.9	185.7	127.0	73.2	304.8	292.1	8	41.1
6	394	228.6	215.9	152.4	82.6	304.8	317.5	12	38.1
8	483	292.1	269.7	203.2	91.9	304.8	393.7	12	44.5
10	584	368.3	323.9	254.0	108.0	406.4	482.6	12	50.8
12	673	450.9	381.0	304.8	124.0	406.4	571.5	16	53.8
14	749	495.3	412.8	355.6	133.4	To be Specified by Purchaser.	635.0	16	60.5
16	826	552.5	469.9	406.4	146.1		704.9	16	66.5
18	914	596.9	533.4	457.2	162.1		774.7	16	73.2
20	984	641.4	584.2	508.0	177.8		831.9	16	79.2
24	1168	762.0	692.2	609.6	203.2		990.6	16	91.9

Notes:

- (1) Bore (B) is the same as nominal pipe size.
- (2) Welding necks longer than listed are available in all sizes on special order.



CLASS 2500 FLANGES LONG WELDING NECK



Unit : mm

Nominal Pipe Size	Out side Diameter	Hub Diameter at Bevel	O. D. of Raised Face	Diameter of Bore	Thickness of Flange Min.	Length Through Hub	DRILLING		
							Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	E	G	B	↑	L	C		d
1	159	57.2	50.8	25.4	35.1	228.6	108.0	4	25.4
1 1/4	184	73.2	63.5	31.8	38.1	228.6	130.0	4	28.4
1 1/2	203	79.2	73.2	38.1	44.5	228.6	146.1	4	31.8
2	235	95.3	91.9	50.8	50.8	228.6	171.5	8	28.4
2 1/2	267	114.3	104.6	63.5	57.2	304.8	196.9	8	31.8
3	305	133.4	127.0	76.2	66.5	304.8	228.6	8	35.1
4	356	165.1	157.2	101.6	76.2	304.8	273.1	8	41.1
5	419	203.2	185.7	127.0	91.9	304.8	323.9	8	47.8
6	483	235.0	215.9	152.4	108.0	304.8	368.3	8	53.8
8	552	304.8	269.7	203.2	127.0	304.8	438.2	12	53.8
10	673	374.7	323.9	254.0	165.1	406.4	539.8	12	66.5
12	762	441.5	381.0	304.8	184.2	406.4	619.3	16	73.2

GUIDE TO MATERIAL LAYOUT & SPECIFICATIONS

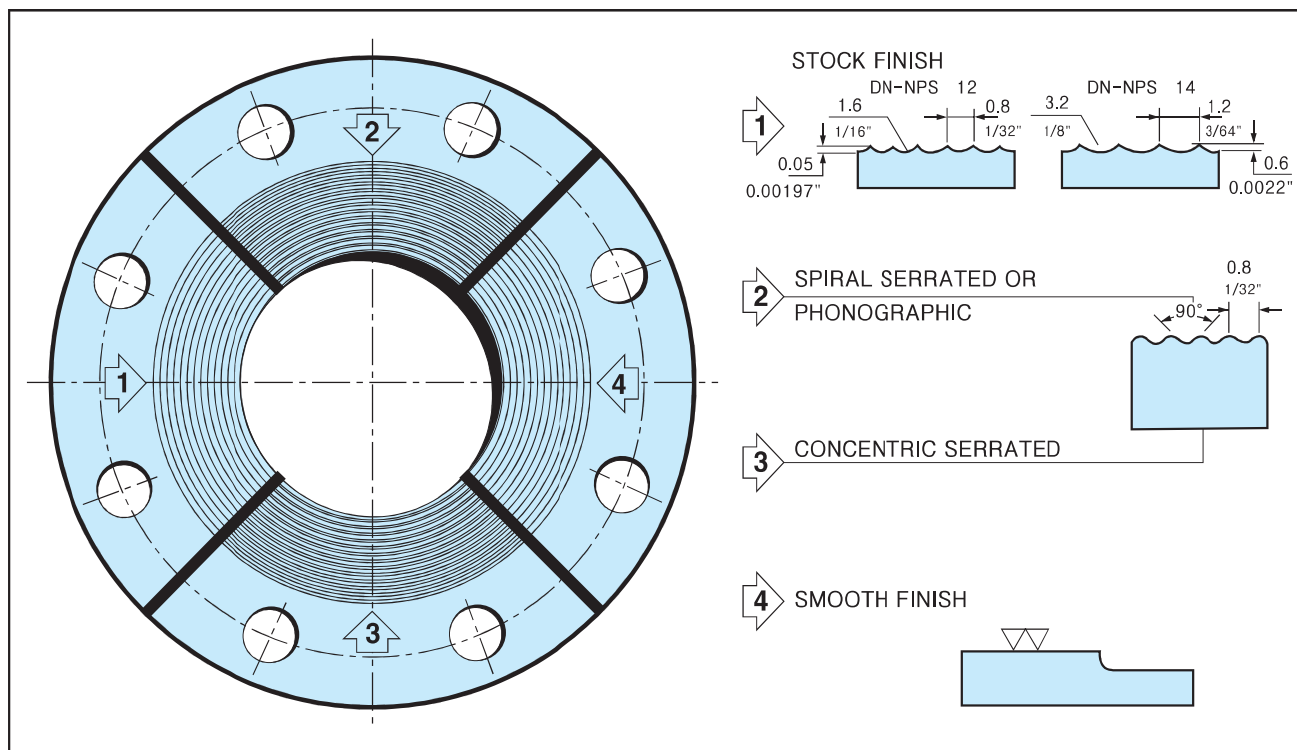
Pipe	Weld Fittings	Screwed & Socket Fittings	Flanges	Valves
A 53	A 234 WPB	A 105, A 181 Gr. 60 or 70	A 105, A 181 Gr. 60 or 70	A 105, A 216 WCB
A 106B	A 234 WPB	A 105, A 181 Gr. 60 or 70	A 105, A 181 Gr. 60 or 70	A 105, A 216 WCB
A 312 T304	A 403 WP-304	A 182 F 304	A 182 F 304	A 182 F 304 CM0
A 312 T316	A 403 WP-316	A 182 F 316	A 182 F 316	A 182 F 316 CM 8MO
A 333 Gr.1or6	A 420 WPL1&6	A 350 LF 1	A 350 LF 1	A 350 LF 1, A 352 LCB
A 333 Gr.3	A 420 WPL-3	A 350 LF 3	A 350 LF 3	A 350 LF 3, A 352 LC3
A 335 P-1	A 234 WP-1	A 182 F 1	A 182 F 1	A 217 WC 6
A 335 P-11	A 234 WP-11	A 182 F 11	A 182 F 11	A 182 F 11, A 217 WC 6
A 335 P-12	A 234 WP-12	A 182 F 12	A 182 F 12	A 217 WC 6
A 335 P-22	A 234 WP-22	A 182 F 22	A 182 F 22	A 182 F 22, A 217 WC 9
A 335 P-5	A 234 WP-5	A 182 F 5	A 182 F 5	A 182 F 5, A 216 WC 5
A 335 P-7	A 234 WP-7	A 182 F 7	A 182 F 7	A 182 F 7, A 217 WC 12
A 335 P-9	A 234 WP-9	A 182 F 9	A 182 F 9	A 182 F 9, A 217 WC 12

Notes:

- (1) Bore (B) is the same as nominal pipe size.
- (2) Welding necks longer than listed are available in all sizes on special order.

STANDARD FINISH

STANDARD FINISHES for Face of Flange (ANSI B16.5)



STOCK FINISH : The most widely used of any gasket finish, because practically, is suitable for all ordinary service conditions. This is a continuous spiral groove. Flanges sizes 12" (304.8mm) and smaller are produced with a 1/16" round-nosed tool at a feed of 1/32" per revolution. For sizes 14" (355.6mm) and larger, the finish is made with 1/8" round-nosed tool at a feed of 3/64" per revolution.

SPIRAL SERRATED OR PHONOGRAPHIC : This finish is produced by using a 90° round-nosed tool.

CONCENTRIC SERRATED : This finish is produced by using a 90° round-nosed tool.

SMOOTH FINISH : The cutting tool employed shall have an approximate 0.06" radius.

The resultant surface finish shall have a 125μ inch to 250μ inch (ANSI B16.5 para 6.4, 4.1)

1. RAISED FACE, AND LARGE MALE AND FEMALE

Either a serrated-concentric or serrated-spiral finish having from 45 to 55 grooves per inch is used.

The cutting tool employed has an approximate 0.06 in radius. The resultant surface finish shall have a 125μ inch (3.2μ) to 250μ inch (6.4μm) approximate roughness.

2. TONGUE AND GROOVE, AND SMALL MALE AND FEMALE

The gasket contact surface does not exceed 125μ in (3.2μm) roughness.

3. RING JOINT

The inside wall surface of gasket groove does not exceed 63μ in (1.6μm) roughness.

4. BLIND

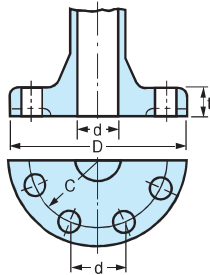
Blind flanges need not be faced in the center if when this center part is raised its diameter is at least 1 in.

smaller than the inside diameter of fittings of the corresponding pressure class. When the center part is depressed, its diameter is not greater than the inside diameter of the corresponding pressure class fittings. Machining of the depressed center is not required.

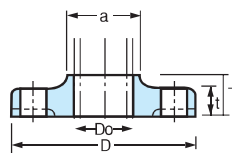


TOLERANCE ANSI B16.5 FORGED FLANGES

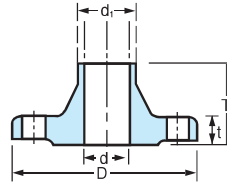
SOLID FLANGE



SLIP-ON FLANGE

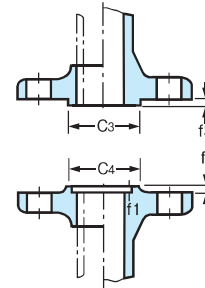


WELDING NECK FLANGE

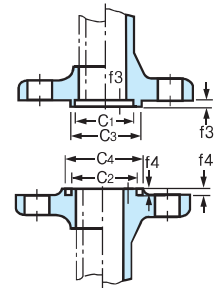


TYPE OF GASKET SURFACE

MALE & FEMALE TYPE



TONGUE & GROOVE TYPE



THREAD, 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 gauge
	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 Diameter	
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)

WELDING NECK

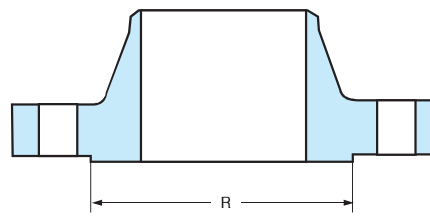
Outside Diameter	When O.D. is 24" or Less	$\pm 1/16"$ (1.6mm)*
	When O.D. is Over 24"	$\pm 1/8"$ (3.2mm)*
Inside Diameter	10" and Smaller	$\pm 1/32"$ (0.8mm)
	12" thru 18"	$\pm 1/16"$ (1.6mm)
	20" and Larger	$+1/8"$ (3.2mm) $-1/16"$ (1.6mm)
Diameter of Contact Face	1/16" Raised Face	$\pm 1/32"$ (0.8mm)
	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.*
	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.

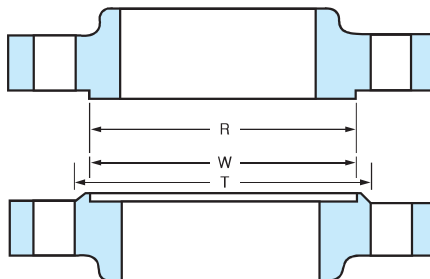


FLANGES FACINGS

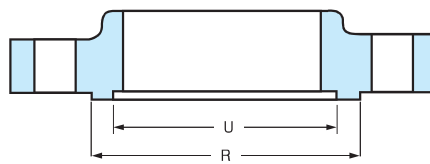
DIMENSIONS OF FLANGE FACINGS



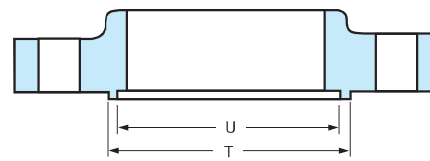
RAISED FACE



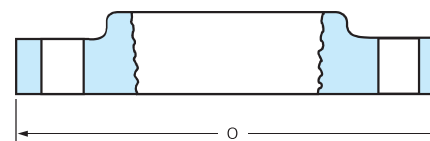
LARGE MALE-FEMALE



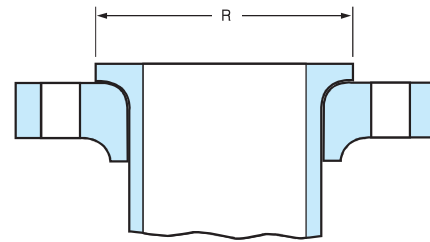
LARGE TONGUE AND GROOVE



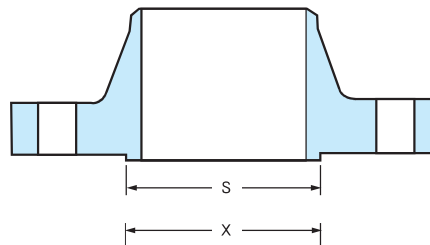
SMALL TONGUE AND GROOVE



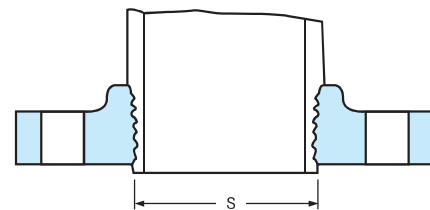
FLAT FACE



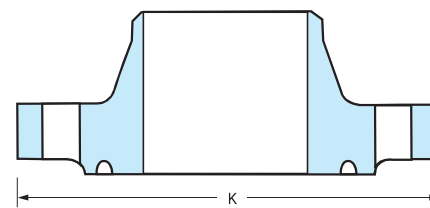
LAPPED JOINT



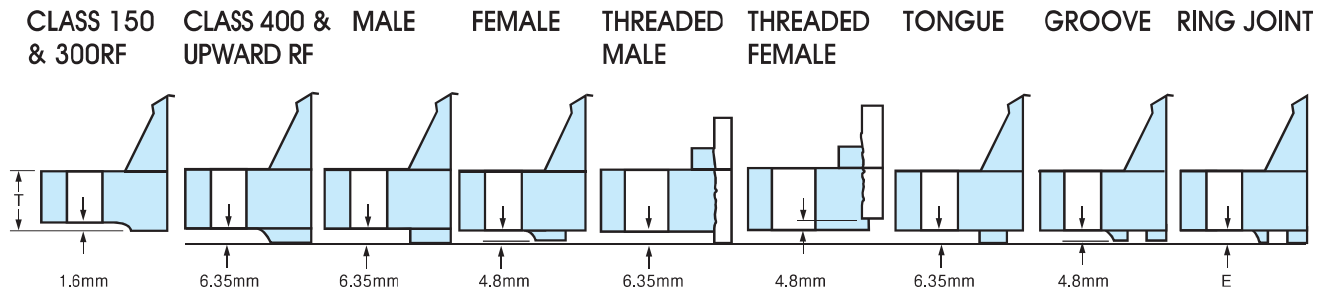
SMALL MALE AND FEMALE



SMALL MALE AND FEMALE



RING JOINT



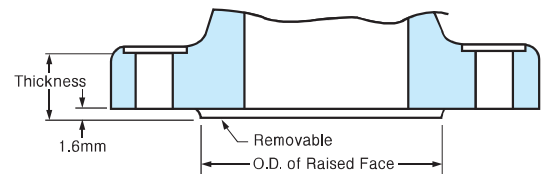
ANSI B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	OUTSIDE DIAMETER			I.D. of Lager and Small Tongue	OUTSIDE DIAMETER				I.D. of Large and Groove	HEIGHT		Depth of Groove or Female
	Raised Face, Lapped Large Male and Large Tongue	Small Male	Small Tongue		Large Female and Large Groove	Small Female	Small Groove	Raised Face, and 300 ST' DS		Raised Face, Large and Small Male and Tongue Classes 400 2500 ST' DS		
											R	
1/2	35.1	18.3	35.1	25.4	36.6	46.0	19.8	36.6	23.9	1.5	6.4	4.8
3/4	42.9	23.9	42.9	33.3	44.5	53.8	25.4	44.5	31.8	1.5	6.4	4.8
1	50.8	30.2	47.8	38.1	52.3	62.0	31.8	49.3	36.6	1.5	6.4	4.8
1 1/4	63.5	38.1	57.2	47.8	65.0	74.7	39.6	58.7	46.0	1.5	6.4	4.8
1 1/2	73.2	44.5	63.5	53.8	74.7	84.1	46.0	65.0	52.3	1.5	6.4	4.8
2	91.9	57.2	82.6	73.2	93.7	103.1	58.7	84.1	71.4	1.5	6.4	4.8
2 1/2	104.6	68.3	95.3	85.9	106.4	115.8	69.9	96.8	84.1	1.5	6.4	4.8
3	127.0	84.1	117.3	108.0	128.5	138.2	85.9	119.1	106.4	1.5	6.4	4.8
3 1/2	139.7	96.8	130.0	120.7	141.2	150.9	98.6	131.8	119.1	1.5	6.4	4.8
4	157.2	109.5	144.5	131.8	158.8	168.1	111.3	146.1	130.0	1.5	6.4	4.8
5	185.7	136.7	173.0	160.3	187.5	196.9	138.2	174.8	158.8	1.5	6.4	4.8
6	215.9	162.1	203.2	190.5	217.4	227.1	163.6	204.7	189.0	1.5	6.4	4.8
8	269.7	212.9	254.0	238.3	271.5	280.9	214.4	255.5	236.5	1.5	6.4	4.8
10	323.9	266.7	304.8	285.8	325.4	335.0	268.2	306.3	284.2	1.5	6.4	4.8
12	381.0	317.5	362.0	342.9	382.5	392.2	319.0	363.5	341.4	1.5	6.4	4.8
14	412.8	349.3	393.7	374.7	414.3	423.9	350.8	395.2	373.1	1.5	6.4	4.8
16	469.9	400.1	447.5	425.5	471.4	481.1	401.6	449.3	423.9	1.5	6.4	4.8
18	533.4	450.9	511.0	489.0	534.9	544.6	452.4	512.8	487.4	1.5	6.4	4.8
20	584.2	501.7	558.8	533.4	585.7	595.4	503.2	560.3	531.9	1.5	6.4	4.8
24	692.2	603.3	666.8	641.4	693.7	703.3	604.8	668.3	639.8	1.5	6.4	4.8

Notes:

- (1) Small male and female faces are not applicable to Slip-on Flange.
- (2) Large male and female faces are not applicable to Class 150 Flanges.
- (3) For flanges of Class 150 and 300 where they are to be bolted to ANSI Class 125 and 250 Cast-Iron Flanges or required with flat face, flat face can be made by removing raised face.

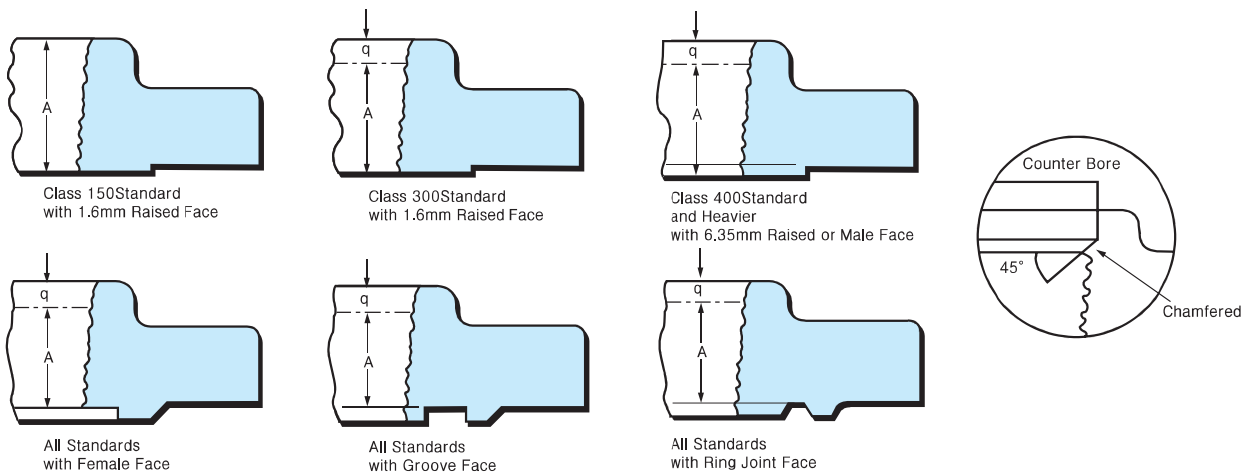


- Tolerances are $\pm 0.03"$ (+0.8mm) for $0.06"$ (1.6mm) RF and $\pm 0.02"$ (+0.5mm) for $0.25"$ (6.35mm) RF Large Male and Large Tongue.



THREAD

THREAD AND STANDARDS FOR ANSI FLANGES (ANSI B2.1)



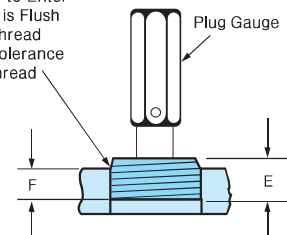
ANSI B16.5 FORGED FLANGES

Unit : mm

Nominal Pipe Size	A—THREAD LENGTHS						
	Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
1/2	15.9	15.9	15.9	15.9	22.2	22.2	28.6
3/4	15.9	15.9	15.9	15.9	25.4	25.4	31.8
1	17.5	17.5	17.5	17.5	28.6	28.6	34.9
1 1/4	20.7	20.7	20.7	20.7	30.2	30.2	38.1
1 1/2	22.2	22.2	22.2	22.2	31.8	31.8	44.5
2	25.4	28.6	28.6	28.6	38.1	38.1	50.8
2 1/2	28.6	31.8	31.8	31.8	47.6	47.6	57.2
3	30.1	31.8	34.9	34.9	41.3	50.8	63.5
3 1/2	31.8	36.5	39.7	39.7			
4	33.4	36.5	36.5	41.3	47.6	57.2	69.9
5	36.5	42.9	42.9	47.6	54.0	63.5	76.2
6	39.7	46.1	46.1	50.8	57.2	69.9	82.6
8	44.5	50.8	50.8	60.3	63.5	76.2	95.3
10	49.2	55.6	55.6	65.1	71.5	84.2	108.0
12	55.6	60.3	60.3	69.9	76.2	92.1	120.7
14	57.2	63.5	63.5	73.0	82.6		
16	63.5	68.3	68.3	77.8	85.7		
18	68.3	69.9	69.9	78.4	88.9		
20	69.9	73.0	73.0	82.6	92.1		
24	82.6	82.6	82.6	92.1	101.6		

Notes:

- (1) Except flanges with Small Male/Female Face (on pipe end), threaded flanges, have an American National Standard taper pipe thread conforming to ANSI B2.1.
- (2) The thread is concentric with the axis of the flange and variations in alignment do not exceed 0.06(1.6mm) in. per foot (0.5 percent)
- (3) Class 150 flanges are made without counterbore. The threads are chamfered approximately to the major diameter of the thread at the back of the flange at an angle of approximately 45 degrees with the axis of thread. The chamfer is concentric with the thread and included in the measurement of the thread length.
- (4) Class 300 and higher pressure flanges are made with a counterbore at the back of the flange. The threads are chamfered to the diameter of the counterbore at an angle of approximately 45 degrees with the axis of the thread. The counterbore and chamfer are concentric with the thread.
- (5) The minimum length of effective thread in reducing flanges is at least equal to dimension Q of the corresponding class of threaded flange as shown in the above tables. Threads do not necessarily extend to the face to the flange.



G=Minimum Pitch Dia. Straight
Female Looknut Thread

Unit : mm

Nominal Pipe Size	Outside Diameter of Pipe	Threads Per inch	Pitch of Thread	Pitch Diameter Beginning of External Threads	Handtight Engagement		Effective Thread External		Wrench Make-up Length for Internal Threaded		Over all Length External Thread
					Length	Pitch Diameter	Length	Pitch Diameter	Length	Pitch Diameter	
					D	N	P	E ₀	L ₁	E ₁	
1/2	21	14	1.8	19.3	8.1	19.8	13.6	20.1	5.4	18.9	19.9
3/4	27	14	1.8	24.6	8.6	25.1	13.9	25.4	5.4	24.2	20.2
1	33	11 1/2	2.2	30.8	10.2	31.5	17.3	31.9	6.6	30.4	25.0
1 1/4	42	11 1/2	2.2	39.6	10.7	40.2	18.0	40.7	6.6	39.1	25.6
1 1/2	48	11 1/2	2.2	45.6	10.7	46.3	18.4	46.8	6.6	45.2	26.0
2	60	11 1/2	2.2	57.6	11.1	58.3	19.2	58.8	6.6	57.2	26.9
2 1/2	73	8	3.2	69.1	17.3	70.2	28.9	70.9	6.4	68.7	39.9
3	89	8	3.2	84.9	19.5	86.1	30.5	86.8	6.4	84.5	41.5
3 1/2	102	8	3.2	97.5	20.9	98.8	31.8	99.5	6.4	97.1	42.8
4	114	8	3.2	110.1	21.4	111.4	33.0	112.2	6.4	109.7	44.0
4 1/2	127	8	3.2	122.7	22.2	124.1	34.3	123.0			
5	141	8	3.2	136.9	23.8	138.4	35.7	139.2	6.4	136.5	46.7
6	168	8	3.2	163.7	24.3	165.3	38.4	166.1	6.4	163.3	49.4
7	194	8	3.2	189.0	25.4	190.6	41.0	189.3			
8	219	8	3.2	214.2	27.0	215.9	43.5	216.9	6.4	213.8	54.5
9	244	8	3.2	239.5	28.7	241.2	46.0	239.8			
10	273	8	3.2	267.9	30.7	269.8	48.9	270.9	6.4	267.5	59.9
11	298	8	3.2	293.1	32.6	295.1	51.4	293.5			
12	324	8	3.2	318.3	34.5	320.5	54.0	321.7	6.4	317.9	65.0
14	356	8	3.2	349.9	39.7	352.4	57.2	353.5	6.4	349.5	68.2
15	381	8	3.2	375.1	42.8	377.8	59.7	375.6			
16	406	8	3.2	400.4	46.0	403.2	62.2	404.3	6.4	400.0	73.2
17	432	8	3.2	425.6	48.3	428.6	64.8	426.1			
18	457	8	3.2	450.9	50.8	454.0	67.3	455.1	6.4	450.5	78.3
20	508	8	3.2	501.3	54.0	504.7	72.4	505.9	6.4	500.9	83.4
24	610	8	3.2	602.3	60.3	606.1	82.6	607.5	6.4	601.9	93.6



WELDED AND SEAMLESS PIPE CARBON AND ALLOY STEELS

ANSI B36.10

Unit : mm

Nominal Pipe		Outside Diam	I.D Wall	Nominal Inside diameter and Wall thickness													
Inch (B)	mm (DN)			Sch. 5	Sch. 10	Sch. 20	Sch. 30	STD	Sch. 40	Sch. 60	Sch. XS	Sch. 80	Sch. 100	Sch. 120	Sch. 140	Sch. 160	Sch. XXS
1/8	6	10.3	I.D		7.8		7.4	6.8	6.8		5.5	5.5					
			Wall		1.2		1.5	1.7	1.7		2.4	2.4					
1/4	8	13.7	I.D		10.4		10.0	9.2	9.2		7.7	7.7					
			Wall		1.7		1.9	2.2	2.2		3.0	3.0					
3/8	10	17.1	I.D		13.8		13.4	12.5	12.5		10.7	10.7					
			Wall		1.7		1.9	2.3	2.3		3.2	3.2					
1/2	15	21.3	I.D	18.0	17.1		16.5	15.8	15.8		13.8	13.8				11.7	6.4
			Wall	1.7	2.1		2.4	2.8	2.8		3.7	3.7				4.8	7.5
3/4	20	26.7	I.D	23.4	22.5		21.9	21.0	21.0		18.9	18.9				15.6	11.1
			Wall	1.7	2.1		2.4	2.9	2.9		3.9	3.9				5.6	7.8
1	25	33.4	I.D	30.1	27.9		27.6	26.6	26.6		24.3	24.3				20.7	15.2
			Wall	1.7	2.8		2.9	3.4	3.4		4.6	4.6				6.4	9.1
1 1/4	32	42.2	I.D	38.9	36.7		36.3	35.1	35.1		32.5	32.5				29.5	22.8
			Wall	1.7	2.8		3.0	3.6	3.6		4.9	4.9				6.4	9.7
1 1/2	40	48.3	I.D	45.0	42.8		41.9	40.9	40.9		38.1	38.1				34.0	28.0
			Wall	1.7	2.8		3.2	3.7	3.7		5.1	5.1				7.1	10.2
2	50	60.3	I.D	57.0	54.8		53.9	52.5	52.5		49.2	49.2				42.8	38.2
			Wall	1.7	2.8		3.2	3.9	3.9		5.5	5.5				8.7	11.1
2 1/2	65	73.0	I.D	68.8	66.9		63.4	62.7	62.7		59.0	59.0				53.9	45.0
			Wall	2.1	3.1		4.8	5.2	5.2		7.0	7.0				9.5	14.0
3	80	88.9	I.D	84.7	82.8		79.3	77.9	77.9		73.7	73.7				66.6	58.4
			Wall	2.1	3.1		4.8	5.5	5.5		7.6	7.6				11.1	15.2
3 1/2	90	101.6	I.D	97.4	95.5		92.0	90.1	90.1		85.4	85.4					
			Wall	2.1	3.1		4.8	5.7	5.7		8.1	8.1					
4	100	114.3	I.D	110.1	108.2		104.7	102.3	102.3		97.2	97.2		92.0		87.3	80.1
			Wall	2.1	3.1		4.8	6.0	6.0		8.6	8.6		11.1		13.5	17.1
5	125	141.3	I.D	135.8	134.5			128.2	128.2		122.2	122.2		115.9		109.5	103.2
			Wall	2.8	3.4			6.6	6.6		9.5	9.5		12.7		15.9	19.1
6	150	168.3	I.D	162.8	161.5			154.1	154.1		146.4	146.4		139.8		131.8	124.4
			Wall	2.8	3.4			7.1	7.1		11.0	11.0		14.3		18.3	22.0
8	200	219.1	I.D	213.6	211.6	206.4	205.0	202.7	202.7	198.5	193.7	193.7	188.9	182.6	177.9	173.1	174.6
			Wall	2.8	3.8	6.4	7.0	8.2	8.2	10.3	12.7	12.7	15.1	18.3	20.6	23.0	22.2
10	250	273.0	I.D	266.2	264.6	260.3	257.4	254.5	254.5	247.6	247.6	242.8	236.5	230.1	222.2	215.8	222.2
			Wall	3.4	4.2	6.4	7.8	9.3	9.3	12.7	12.7	15.1	18.3	21.4	25.4	28.6	25.4
12	300	323.8	I.D	315.9	314.7	311.1	307.0	304.7	303.2	295.3	298.4	288.8	280.9	273.0	266.6	257.2	273.0
			Wall	4.0	4.6	6.4	8.4	9.5	10.3	14.3	12.7	17.5	21.4	25.4	28.6	33.3	25.4
14	350	355.6	I.D	347.7	342.9	339.8	336.5	336.5	333.3	325.4	330.2	317.5	307.9	300.0	292.1	284.2	
			Wall	4.0	3.7	7.9	9.5	9.5	11.1	15.1	12.7	19.1	23.8	27.8	31.8	35.7	
16	400	406.4	I.D	398.0	393.7	390.6	387.3	387.3	381.0	373.1	381.0	363.5	354.0	344.5	333.3	325.4	
			Wall	4.2	6.4	7.9	9.5	9.5	12.7	16.7	12.7	21.4	26.2	31.0	36.5	40.5	
18	450	457.0	I.D	448.6	444.3	441.2	434.7	437.9	428.5	418.9	431.6	409.3	398.3	387.1	377.7	366.5	
			Wall	4.2	6.4	7.9	11.1	9.5	14.3	19.1	12.7	23.8	29.4	34.9	39.7	45.2	
20	500	508.0	I.D	498.4	495.3	488.9	482.6	488.9	477.8	466.8	482.6	455.6	442.9	431.8	419.1	408.0	
			Wall	4.8	6.4	9.5	12.7	9.5	15.1	20.6	12.7	26.2	32.5	38.1	44.5	50.0	
22	550	559.0	I.D	549.4	546.3	539.9	533.6	539.9		514.5	533.6	501.8	489.1	476.4	463.7	451.0	
			Wall	4.8	6.4	9.5	12.7	9.5		22.2	12.7	28.6	34.9	41.3	47.6	54.0	
24	600	610.0	I.D	598.9	597.3	590.9	581.5	590.9	575.0	560.8	584.6	548.1	532.2	518.0	505.3	490.9	
			Wall	5.5	6.4	9.5	14.3	9.5	17.5	24.6	12.7	31.0	38.9	46.0	52.4	59.5	

► Not included B36.10

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

Note that schedule 40 in, size 12" (304.8mm) and larger and that schedule 80 in, size 10" (254mm) and larger do not agree with schedules 40S and 80S of ANSI B36. 19 nor with standard weight and extra strong respectively.



WELDED AND SEAMLESS PIPE STAINLESS STEELS

ANSI B36.19

Unit : mm

Nominal Pipe Size		Outside Diam	I.D Wall	Nominal Inside diameter and Wall thickness			
Inch (B)	mm (DN)			Sch. 5S	Sch. 10S	Sch. 40S	Sch. 80S
1/8	6	10.3	I.D		7.8	6.8	5.5
			Wall		1.2	1.7	2.4
1/4	8	13.7	I.D		10.4	9.2	7.7
			Wall		1.7	2.2	3.0
3/8	10	17.1	I.D		13.8	12.5	10.7
			Wall		1.7	2.3	3.2
1/2	15	21.3	I.D	18.0	17.1	15.8	13.8
			Wall	1.7	2.1	2.8	3.7
3/4	20	26.7	I.D	23.4	22.5	21.0	18.9
			Wall	1.7	2.1	2.9	3.9
1	25	33.4	I.D	30.1	27.9	26.6	24.3
			Wall	1.7	2.8	3.4	4.6
1 1/4	32	42.2	I.D	38.9	36.7	35.1	32.5
			Wall	1.7	2.8	3.6	4.9
1 1/2	40	48.3	I.D	45.0	42.8	40.9	38.1
			Wall	1.7	2.8	3.7	5.1
2	50	60.3	I.D	57.0	54.8	52.5	49.2
			Wall	1.7	2.8	3.9	5.5
2 1/2	65	73.0	I.D	68.8	66.9	62.7	59.0
			Wall	2.1	3.1	5.2	7.0
3	80	88.9	I.D	84.7	82.8	77.9	73.7
			Wall	2.1	3.1	5.5	7.6
3 1/2	90	101.6	I.D	97.4	95.5	90.1	85.4
			Wall	2.1	3.1	5.7	8.1
4	100	114.3	I.D	110.1	108.2	102.3	97.2
			Wall	2.1	3.1	6.0	8.6
5	125	141.3	I.D	135.8	134.5	128.2	122.2
			Wall	2.8	3.4	6.6	9.5
6	150	168.3	I.D	162.8	161.5	154.1	146.4
			Wall	2.8	3.4	7.1	11.0
8	200	219.1	I.D	213.6	211.6	202.7	193.7
			Wall	2.8	3.8	8.2	12.7
10	250	273.0	I.D	266.2	264.7	254.6	247.7
			Wall	3.4	4.2	9.3	12.7
12	300	323.8	I.D	315.9	317.8	304.8	298.5
			Wall	4.0	4.6	9.5	12.7
14	350	355.6	I.D	347.7	346.0		
			Wall	4.0	4.8		
16	400	406.4	I.D	398.0	396.8		
			Wall	4.2	4.8		
18	450	457.0	I.D	448.6	447.4		
			Wall	4.2	4.8		
20	500	508.0	I.D	498.4	496.9		
			Wall	4.8	5.5		
22	550	559.0	I.D	549.4	547.9		
			Wall	4.8	5.5		
24	600	610.0	I.D	598.9	597.3		
			Wall	5.5	6.35		

The wall thickness shown represent nominal or average wall dimensions which are subject to a-12 1/2% mill tolerance. Sizes 14" (355.6mm) through 30" (762.0mm) are not at publication date covered in B36.19, and dimensions listed are those commonly used in the industry.

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

*Note that schedule 40S and schedule 80S in these size 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 GRADE

GRADE	COMPOSITION										UNS NO.	DIN	Tensile Strength	Yield Strength	Brinell
	C	Mn	P	S	Si	Ni	Cr	Mo	N	V			Min, ksi(MPa)	Min, ksi(MPa)	Hardness
LOW ALLOY STEELS															
F1	0.28	0.06-0.90	0.045	0.045	0.15-0.35			0.44-0.65			K12822	15Mo3	70(485)	40(275)	143-192
F5	0.15	0.30-0.60	0.03	0.03	0.5	0.5	4.0-6.0	0.44-0.65			K41545	12CrMo19-5	70(485)	40(275)	143-217
F9	0.15	0.30-0.60	0.03	0.03	0.50-1.10		8.0-10.0	0.90-1.10			K90941	12-CrMo9-1	85(585)	55(380)	179-217
F91	0.08-0.12	0.30-0.60	0.02	0.01	0.20-0.50	0.4	3.0-9.5	0.85-1.05			K90901	X10CrMoN69-1	85(585)	60(415)	248max
F92	0.07-0.13	0.30-0.60	0.02	0.01	0.5	0.4	8.50-9.50	0.30-0.60					90(620)	64(440)	269max
F11	0.05-0.15	0.30-0.60	0.03	0.03	0.50-1.00		1.00-1.50	0.44-0.65			K11597	13CrMo44	60(615)	30(205)	121-174
F12	0.05-0.15	0.30-0.60	0.045	0.045	0.50		0.80-1.25	0.44-0.65			K11562	16CrMo44	60(415)	32(220)	121-174
F22	0.05-0.15	0.30-0.60	0.04	0.04	0.5		2.00-2.50	0.87-1.13			K21590	10CrMo9-10	60(415)	30(205)	170max
F23	0.04-0.10	0.10-0.60	0.03	0.01	0.5		1.92-2.60	0.05-0.30			K41650		74(510)	58(400)	220max
SCM440	0.38-0.43	0.60-0.90	0.03	0.03	0.15-0.35	0.25	0.90-1.20	0.15-0.30				42CrMo4			
SNCM439	0.36-0.43	0.60-0.90	0.03	0.03	0.15-0.35	1.60-2.00	0.60-1.00	0.15-0.30				36CrNiMo4			
STAINLESS STEELS (MARTENSITIC)															
F6	0.15	1	0.04	0.03	1	0.5	11.5-13.5				\$41000	X12Cr13	70(485)	40(275)	143-207
STAINLESS STEELS (FERRITIC)															
F429	0.12	1	0.04	0.03	0.75	0.5	14.0-16.0				\$42900		60(415)	35(240)	190max
F430	0.12	1	0.04	0.03	0.75	0.5	15.0-18.0				\$43000		60(415)	35(240)	190max
STAINLESS STEELS(AUSTENITIC)															
F304L	0.03	2	0.045	0.03	1	8.0-13.0	13.0-20.0				\$30403	X2CrNi19-11	70(485)	25(170)	
F310	0.25	2	0.045	0.03	1	19.0-22.0	24.0-26.0				\$31000	X12CrNi25-20	75(515)	30(205)	
F316L	0.03	2	0.045	0.03	1	10.0-15.0	16.0-18.0	2.0-3.0			\$31603	X2CrNiMo18-14-3	70(485)	25(170)	
F317L	0.03	2	0.045	0.03	1	11.0-15.0	13.0-20.0	3.0-4.0			\$31703		70(485)	25(170)	
F321	0.08	2	0.045	0.03	1	9.0-12.0	17.0-19.0				\$32100	X6CrNiTi18-10	75(515)	30(205)	
F347	0.08	2	0.045	0.03	1	9.0-13.0	17.0-20.0				\$34700	X6CrNiNb18-10	75(515)	30(205)	
F44	0.02	1	0.03	0.01	0.8	17.5-18.5	19.5-20.5	6.0-6.5			\$31254		94(650)	44(300)	
STAINLESS STEELS (DUPLEX)															
F51	0.03	2	0.03	0.02	1	4.5-6.5	21.0-23.0	2.5-3.5			\$31803	X2CrNiMoN22-5-3	90(620)	65(450)	
F53	0.03	1.2	0.035	0.02	0.8	6.8-8.0	24.0-26.0	3.0-5.0			\$32750	X2CrNiMoCuWN25-7-4	116(800)	80(550)	310max
F904L	0.02	2	0.04	0.03	1	23.0-28.0	19.0-23.0	4.0-5.0			NO8904		71(490)	31(215)	
SUSF329J3L	0.03	2.0	0.04	0.030	1.00	4.50-6.50	21.0-24.0	2.50-3.50	0.08-0.20						
F60											\$32205				
CARBON STEELS															
A105	0.35	0.60-1.05	0.035	0.04	0.10-0.35	0.4	0.3	0.12				CK25	70(485)	36(250)	187
A350LF2	0.3	0.60-1.35	0.035	0.04	0.15-0.30	0.4	0.3	0.12					70-95 (485-655)	36(250)	197
A350LF3	0.2	0.9	0.035	0.04	0.20-0.35	3.3-3.7	0.3	0.12					70-95 (485-655)	37.5(260)	
A694/F65	0.26	1.4	0.025	0.025	0.15-0.35								77(530)	65(450)	
S45C	0.42-0.48	0.60-0.90	0.30	0.35	0.15-0.35							CK45			
ALLOY STEELS															
ALLOY20	0.07	2	0.45	0.35	1	32-38	19-21	2.0-3.0			NO8020				
ALLOY625	0.1	0.5	0.015	0.015	0.5	58	20-23	8.0-10.0			NO6625				
ALLOY800	0.1	1.5		0.015	1	30-35	19-23				NO8800				
A800H/HT	0.05-0.10	1.5		0.015	1	30-35	19-23				NO8810/11				
ALLOY825	0.05	1		0.03	0.5	38-46	19.5-23.5	2.50-3.50			NO8825				
MOLD STEELS															
SKT	0.50-0.60	0.60-0.90	0.03	0.02	0.10-0.40	1.50-1.80	0.80-1.20	0.35-0.55		0.05-0.15					
STD61	0.32-0.42	0.50	0.03	0.03			4.50-5.50	1.00-1.50		0.80-1.20					



MATERIAL SPECIFICATIONS

APPLICABLE ASTM SPECIFICATIONS

GROUP 1 MATERIALS				PRODUCT FORMS			
Material Group No.	Nominal Designation Steel	Forgings Spec. -Gr.	Notes	Castings Spec. -Gr.	Notes	Forgings Spec. -Gr.	Notes
1.1	Carbon	A105 A350-LF2	(1)(3)	A216-WCB	(1)	A515-70 A516-70 A537-C1.1	(1) (1)
1.2	C-Mn-Si Carbon			A216-WCC A352-LCC A352-LC2	(1)		
	2-1/2 Ni 3-1/2 Ni	A350-LF3		A352-LC3		A203-B A302-E	
1.3	Carbon			A352-LCB	(1)	A203-A A203-D A515-65 A516-65	
1.4	Carbon	A350-LF1				A515-60 A516-60	(1)
1.5	C-1/2 Mo	A182-F1	(2)	A217-WC1 A352-LC1	(2)(4)	A204-A A204-B	(2) (2)
1.7	C-1/2 Mo 1/2 Cr-1/2 Mo Ni-Cr-1/2 Mo Ni-Cr-1 Mo	A182-F2				A204-C	(2)
				A217-WC4 A217-WC5	(4) (4)		
1.9	1/4 Cr-1/2 Mo 1-1/4 Cr-1/2 Mo	A182-F12 A182-F11	(4) (4)	A217-WC6	(4)	A387-11 C1.2	
1.10	2-1/4 Cr-1 Mo	A182-F22		A217-WC9	(4)	A387-22 C1.2	
1.13	5 Cr-1/2 Mo	A181-F5 A182-F5a		A217-C5	(4)		
1.14	9 Cr-1 Mo	A182-F9		A217-C12	(4)		

GROUP 2 MATERIALS				PRODUCT FORMS			
2.1	18 Cr-8 Ni 18 Cr-8 Ni	A182-F304 A182-F304H	(5)	A351-CF3 A351-CF8	(5)	A240-304 A240-304H	(5)(6)
2.2	16 Cr-12 Ni-2 Mo 18 Cr-13 Ni-3 Mo 18 Cr-9 Ni-2 Mo	A182-F316 A182-F316H	(5)			A240-316 A240-316H A240-317	(5)(6) (5)(6)
				A351-CF3M A351-CF8M	(5)		
2.3	18 Cr-8 Ni 16 Cr-12 Ni-2 Mo	A182-F304L A182-F316L				A240-304L A240-316L	
2.4	18 Cr-10 Ni-Ti	A182-F321 A182-F321H	(5)			A240-321 A240-321H	(5)(6)
2.5	18 Cr-10 Ni-Cb	A182-F347 A182-F347H A182-F348 A182-F348H	(5)	A351-CF8C	(5)	A240-347 A240-347H A240-348 A240-348H	(5)(6) (5)(6)
2.6	25 Cr-12 Ni 23 Cr-12 Ni			A351-CH8 A351-CH20	(5) (5)		
						A240-309S	(5)(6)
2.7	25 Cr-20 Ni	A182-F310	(5)(7)	A351-CK20	(5)	A240-310S	(5)(6)(7)

General Notes:

- For temperature limitations see footnotes in ANSI B16.5 TABLES. (PRESSURE-TEMPERATURE RATINGS)
- 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 temperatures 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.



PRESSURE–TEMPERATURE RATINGS ANSI B16.5/B16.47 FORGED FLANGES

TABLES 2
PRESSURE-TEMPERATURE RATINGS

TABLE 2-75 CLASS 75 PRESSURE-TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Types 304L, 316L	Type 321	Types 347, 348	Type 309	Type 310
Temp., °F	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Types 304L, 316L	Type 321	Types 347, 348	Type 309	Type 310
-20 to 100	140	145	130	115	130	145	145	145	145	145	135	135	115	135	135	130	130
200	130	130	125	105	130	130	130	130	130	130	115	120	95	115	120	115	115
300	115	115	115	105	115	115	115	115	115	115	100	105	85	105	110	110	110
400	100	100	100	100	100	100	100	100	100	100	90	95	80	95	100	100	100
500	85	85	85	85	85	85	85	85	85	85	85	85	70	85	85	85	85
600	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
650	60	60	60	60	60	60	60	60	60	60	60	60	70	60	60	60	60
700	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
750	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
800	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
850	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
900	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
950	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1000	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE 2-150 CLASS 150 PRESSURE-TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Types 304L, 316L	Type 321	Types 347, 348	Type 309	Type 310
Temp., °F	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Types 304L, 316L	Type 321	Types 347, 348	Type 309	Type 310
-20 to 100	285	290	265	235	265	290	290	290	290	290	275	275	230	275	275	260	260
200	260	260	250	215	260	260	260	260	260	260	235	240	195	235	245	230	230
300	230	230	230	210	230	230	230	260	260	260	205	215	175	210	225	220	220
400	200	200	200	200	200	200	200	200	200	200	180	195	160	190	200	200	200
500	170	170	170	170	170	170	170	170	170	170	170	170	145	170	170	170	170
600	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
650	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
700	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
750	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
800	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
850	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
900	50	50	50	50	50	50	50	50	50	50	50	50	...	50	50	50	50
950	35	35	35	35	35	35	35	35	35	35	35	35	...	35	35	35	35
1000	20	20	20	20	20	20	20	20	20	20	20	20	...	20	20	20	20

(Table 2 continues on next page ; Notes follow at end of Table)



TABLE 2-300 CLASS 300 PRESSURE-TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
Temp., °F	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
-20 to 100	740	750	695	620	695	750	750	750	750	750	720	720	600	720	720	670	670
200	675	750	655	560	680	750	710	715	750	750	600	620	505	610	635	605	605
300	655	730	640	550	655	730	675	675	730	730	530	560	455	545	590	570	570
400	635	705	620	530	640	705	660	650	705	705	470	515	415	495	555	535	535
500	600	665	585	500	620	665	640	640	665	665	435	480	380	460	520	505	505
600	550	605	535	455	605	605	605	605	605	605	415	450	360	435	490	480	480
650	535	590	525	450	590	590	590	590	590	590	410	445	350	430	480	465	465
700	535	570	520	450	570	570	570	570	570	570	405	430	345	420	470	455	455
750	505	505	475	445	530	530	530	530	530	530	400	425	335	415	460	445	445
800	410	410	390	370	510	510	510	510	500	510	395	415	330	415	455	435	435
850	270	270	270	270	485	485	485	485	440	485	390	405	320	410	445	425	425
900	170	170	170	170	450	450	450	450	355	450	385	395	...	405	430	415	415
950	105	105	105	105	280	345	380	380	260	370	375	385	...	385	385	385	385
1000	50	50	50	50	165	215	225	270	190	290	325	365	...	355	365	335	350
1050	...	...	...	...	...	190	140	200	140	190	310	360	...	345	360	290	335
1100	...	...	...	...	...	...	95	115	105	115	260	325	...	300	325	225	290
1150	...	...	...	...	...	...	50	105	70	75	195	275	...	235	275	170	245
1200	...	...	...	...	...	...	35	55	45	50	155	205	...	180	170	130	205
1250	...	...	...	...	...	...	...	...	...	...	110	180	...	140	125	100	160
1300	...	...	...	...	...	...	...	...	...	...	85	140	...	105	95	80	120
1350	...	...	...	...	...	...	...	...	...	...	60	105	...	80	70	60	80
1400	...	...	...	...	...	...	...	...	...	...	50	75	...	60	50	45	55
1450	...	...	...	...	...	...	...	...	...	...	35	60	...	50	40	30	40
1500	...	...	...	...	...	...	...	...	...	...	25	40	...	40	35	25	25

TABLE 2-400 CLASS 400 PRESSURE-TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
Temp., °F	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
-20 to 100	990	1000	925	825	925	1000	1000	1000	1000	1000	960	960	800	960	960	895	895
200	900	1000	875	750	905	1000	950	955	1000	1000	800	825	675	815	850	805	805
300	875	970	850	730	870	970	895	905	970	970	705	745	605	725	785	760	760
400	845	940	825	705	855	940	880	865	940	940	630	685	550	660	740	710	710
500	800	885	775	665	830	885	885	855	885	885	585	635	510	610	690	670	670
600	730	805	710	610	805	805	805	805	805	805	555	600	480	585	655	635	635
650	715	785	695	600	785	785	785	785	785	785	545	590	470	570	640	620	620
700	710	755	690	600	755	755	755	755	755	755	540	575	460	560	625	610	610
750	670	670	630	590	710	710	710	710	710	710	530	565	450	555	615	595	595
800	550	550	520	495	675	675	675	665	675	675	525	555	440	550	610	580	580
850	355	355	335	335	650	650	650	585	650	650	520	540	430	545	590	565	565
900	230	230	230	230	600	600	600	470	600	600	510	525	...	540	575	555	555
950	140	140	140	140	375	460	505	350	495	500	515	...	...	515	515	515	515
1000	70	70	70	70	220	285	300	355	255	390	430	485	...	475	485	450	465
1050	...	...	...	...	...	250	185	265	190	250	410	480	...	460	480	390	445
1100	...	...	...	...	...	...	130	150	140	150	345	430	...	400	430	300	390
1150	...	...	...	...	...	...	70	140	90	100	260	365	...	315	365	230	330
1200	...	...	...	...	...	...	45	75	60	70	205	275	...	240	230	175	275
1250	...	...	...	...	...	...	...	...	...	...	145	245	...	185	165	135	215
1300	...	...	...	...	...	...	...	...	...	...	110	185	...	140	125	105	160
1350	...	...	...	...	...	...	...	...	...	...	85	140	...	110	90	80	105
1400	...	...	...	...	...	...	...	...	...	...	65	100	...	80	70	60	75
1450	...	...	...	...	...	...	...	...	...	...	45	80	...	65	55	40	50
1500	...	...	...	...	...	...	...	...	...	...	30	55	...	50	45	30	30

(Table 2 continues on next page ; Notes follow at end of Table)



PRESSURE–TEMPERATURE RATINGS ANSI B16.5/B16.47 FORGED FLANGES

TABLE 2–600 CLASS 600 PRESSURE–TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
Temp., °F	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
–20 to 100	1480	1500	1390	1235	1390	1500	1500	1500	1500	1500	1440	1440	1200	1440	1440	1345	1345
200	1350	1500	1315	1125	1360	1500	1425	1430	1500	1500	1200	1240	1015	1220	1270	1210	1210
300	1315	1455	1275	1095	1305	1455	1345	1355	1455	1455	1055	1120	910	1090	1175	1140	1140
400	1270	1410	1235	1060	1280	1410	1315	1295	1410	1410	940	1030	825	990	1110	1065	1065
500	1200	1330	1165	995	1245	1330	1285	1280	1330	1330	875	955	765	915	1035	1010	1010
600	1095	1210	1065	915	1210	1210	1210	1210	1210	1210	830	905	720	875	985	955	955
650	1075	1175	1045	895	1175	1175	1175	1175	1175	1175	815	890	700	855	960	930	930
700	1065	1135	1035	895	1135	1135	1135	1135	1135	1135	805	865	685	840	935	910	910
750	1010	1010	945	885	1065	1065	1065	1065	1065	1065	795	845	670	830	920	895	895
800	825	825	780	740	1015	1015	1015	1015	995	1015	790	830	660	825	910	870	870
850	535	535	535	535	975	975	975	975	880	975	780	810	645	815	890	850	850
900	345	345	345	345	900	900	900	900	705	900	770	790	...	810	865	830	830
950	205	205	205	205	560	685	755	755	520	740	750	775	...	775	775	775	775
1000	105	105	105	105	330	425	445	535	385	585	645	725	...	715	725	670	700
1050	...	...	...	...	...	380	275	400	280	380	620	720	...	695	720	585	665
1100	...	...	...	...	...	...	190	225	205	225	515	645	...	605	645	445	585
1150	...	...	...	...	...	...	105	205	140	150	390	550	...	475	550	345	495
1200	...	...	...	...	...	...	70	110	90	105	310	410	...	365	345	260	410
1250	...	...	...	...	...	...	...	...	...	...	220	365	...	280	245	200	325
1300	...	...	...	...	...	...	...	...	...	...	165	275	...	210	185	160	240
1350	...	...	...	...	...	...	...	...	...	...	125	205	...	165	135	115	160
1400	...	...	...	...	...	...	...	...	...	...	90	150	...	125	105	90	110
1450	...	...	...	...	...	...	...	...	...	...	70	115	...	95	80	60	75
1500	...	...	...	...	...	...	...	...	...	...	50	85	...	75	70	50	50

TABLE 2–900 CLASS 900 PRESSURE–TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
Temp., °F	Carbon				C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
–20 to 100	2220	2250	2085	1850	2085	2250	2250	2250	2250	2250	2160	2160	1800	2160	2160	2015	2015
200	2025	2250	1970	1685	2035	2250	2135	2150	2250	2250	1800	1860	1520	1830	1910	1815	1815
300	1970	2185	1915	1640	1955	2185	2020	2030	2185	2185	1585	1680	1360	1635	1765	1705	1705
400	1900	2115	1850	1585	1920	2115	1975	1945	2115	2115	1410	1540	1240	1485	1665	1600	1600
500	1795	1995	1745	1495	1865	1995	1925	1920	1995	1995	1310	1435	1145	1375	1555	1510	1510
600	1640	1815	1600	1370	1815	1815	1815	1815	1815	1815	1245	1355	1080	1310	1475	1435	1435
650	1610	1765	1570	1345	1765	1765	1765	1765	1765	1765	1225	1330	1050	1280	1440	1395	1395
700	1600	1705	1555	1345	1705	1705	1705	1705	1705	1705	1210	1295	1030	1260	1405	1370	1370
750	1510	1510	1420	1325	1595	1595	1595	1595	1595	1595	1195	1270	1010	1245	1385	1340	1340
800	1235	1235	1175	1110	1525	1525	1525	1525	1490	1525	1180	1245	985	1240	1370	1305	1305
850	805	805	805	805	1460	1460	1460	1460	1315	1460	1165	1215	965	1225	1330	1275	1275
900	515	515	515	515	1350	1350	1350	1350	1060	1350	1150	1180	...	1215	1295	1245	1245
950	310	310	310	310	845	1030	1130	1130	780	1110	1125	1160	...	1160	1160	1160	1160
1000	515	155	155	155	495	640	670	805	575	875	965	1090	...	1070	1090	1010	1050
1050	...	...	...	...	...	565	410	595	420	565	925	1080	...	1040	1080	875	1000
1100	...	...	...	...	...	...	290	340	310	340	770	965	...	905	965	670	875
1150	...	...	...	...	...	...	155	310	205	225	585	825	...	710	825	515	740
1200	...	...	...	...	...	...	105	165	135	155	465	620	...	545	515	390	620
1250	...	...	...	...	...	...	...	...	...	...	330	545	...	420	370	300	485
1300	...	...	...	...	...	...	...	...	...	...	245	410	...	320	280	235	360
1350	...	...	...	...	...	...	...	...	...	...	185	310	...	245	205	175	235
1400	...	...	...	...	...	...	...	...	...	...	145	225	...	185	155	135	165
1450	...	...	...	...	...	...	...	...	...	...	105	175	...	145	125	95	115
1500	...	...	...	...	...	...	...	...	...	...	70	125	...	115	105	70	70

(Table 2 continues on next page ; Notes follow at end of Table)



TABLE 2-1500 CLASS 1500 PRESSURE-TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon Steel				Alloy Seels						Austenitic Seels						
Temp., °F					C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
-20 to 100	3705	3750	3470	3085	3470	3750	3750	3750	3750	3750	3600	3600	3000	3600	3600	3360	3360
200	3375	3750	3280	2810	3395	3750	3560	3580	3750	3750	3000	3095	2530	3050	3180	3025	3025
300	3280	3640	3190	2735	3260	3640	3365	3385	3640	3640	2640	2795	2270	2725	2940	2845	2845
400	3170	3530	3085	2645	3200	3530	3290	3240	3530	3530	2350	2570	2065	2470	2770	2665	2665
500	2995	3325	2910	2490	3105	3325	3210	3200	3325	3325	2185	2390	1910	2290	2590	2520	2520
600	2735	3025	2665	2285	3025	3025	3025	3025	3025	3025	2075	2255	1800	2185	2460	2390	2390
650	2685	2940	2615	2245	2940	2940	2940	2940	2940	2940	2040	2220	1750	2135	2400	2330	2330
700	2665	2840	2590	2245	2840	2840	2840	2840	2840	2840	2015	2160	1715	2100	2340	2280	2280
750	2520	2520	2365	2210	2660	2660	2660	2660	2660	2660	1990	2110	1680	2075	2305	2230	2230
800	2060	2060	1955	1850	2540	2540	2540	2540	2485	2540	1970	2075	1645	2065	2280	2170	2170
850	1340	1340	1340	1340	2435	2435	2435	2435	2195	2435	1945	2030	1610	2040	2220	2125	2125
900	860	860	860	860	2245	2245	2245	2245	1765	2245	1920	1970	...	2030	2160	2075	2075
950	515	515	515	515	1405	1715	1885	1885	1305	1850	1870	1930	...	1930	1930	1930	1930
1000	260	260	260	260	825	1065	1115	1340	960	1460	1610	1820	...	1785	1820	1680	1750
1050	...	...	...	...	...	945	685	995	705	945	1545	1800	...	1730	1800	1460	1665
1100	...	...	...	...	...	...	480	565	515	565	1285	1610	...	1510	1610	1115	1460
1150	...	...	...	...	...	...	260	515	345	380	980	1370	...	1185	1370	860	1235
1200	...	...	...	...	...	...	170	275	225	260	770	1030	...	910	855	650	1030
1250	...	...	...	...	...	...	...	...	...	...	550	910	...	705	615	495	805
1300	...	...	...	...	...	...	...	...	...	...	410	685	...	530	465	395	600
1350	...	...	...	...	...	...	...	...	...	...	310	515	...	410	345	290	395
1400	...	...	...	...	...	...	...	...	...	...	240	380	...	310	255	225	275
1450	...	...	...	...	...	...	...	...	...	...	170	290	...	240	205	155	190
1500	...	...	...	...	...	...	...	...	...	...	120	205	...	190	170	120	120

TABLE 2-2500 CLASS 2500 PRESSURE-TEMPERATURE RATINGS

Pressures are in pounds per square inch, gage (psig)

Material Group	1.1	1.2	1.3	1.4	1.5	1.7	1.9	1.10	1.13	1.14	2.1	2.2	2.3	2.4	2.5	2.6	2.7
Materials	Carbon Steel				Alloy Seels						Austenitic Seels						
Temp., °F					C- 1/2Mo	1/2Cr- 1/2Mo, Ni-Cr- Mo	1Cr- 1/2Mo, 1 1/4Cr- 1/2Mo	2 1/4Cr- 1Mo	5Cr- 1/2Mo	9Cr- 1Mo	Type 304	Type 316	Type 304L Type 316L	Type 321	Types 347, 348	Type 309	Type 310
-20 to 100	6170	6250	5785	5145	5785	6250	6250	6250	6250	6250	6000	6000	5000	6000	6000	5600	5600
200	5625	6250	5470	4680	5660	6250	5930	5965	6250	6250	5000	5160	4220	5080	5300	5040	5040
300	5470	6070	5315	4560	5435	6070	5605	5640	6070	6070	4400	4660	3780	4540	4900	4740	4740
400	5280	5880	5145	4405	5330	5880	5485	5400	5880	5880	3920	4280	3440	4120	4620	4440	4440
500	4990	5540	4850	4150	5180	5540	5350	5330	5540	5540	3640	3980	3180	3820	4320	4200	4200
600	4560	5040	4440	3805	5040	5040	5040	5040	5040	5040	3460	3760	3000	3640	4100	3980	3980
650	4475	4905	4355	3740	4905	4905	4905	4905	4905	4905	3400	3700	2920	3560	4000	3880	3880
700	4440	4730	4320	3740	4730	4730	4730	4730	4730	4730	3360	3600	2860	3500	3900	3800	3800
750	4200	4200	3945	3685	4430	4430	4430	4430	4430	4430	3320	3520	2800	3460	3840	3720	3720
800	3430	3430	3260	3085	4230	4230	4230	4230	4145	4230	3280	3460	2740	3440	3800	3620	3620
850	2230	2230	2230	2230	4060	4060	4060	4060	3660	4060	3240	3380	2680	3400	3700	3540	3540
900	1430	1430	1430	1430	3745	3745	3745	3745	2945	3745	3200	3280	...	3380	3600	3460	3460
950	860	860	860	860	2345	2860	3145	3145	2170	3085	3120	3220	...	3220	3220	3220	3220
1000	430	430	430	430	1370	1770	1860	2230	1600	2430	2685	3030	...	2970	3030	2800	2915
1050	...	...	...	...	...	1570	1145	1660	1170	1570	2570	3000	...	2885	3000	2430	2770
1100	...	...	...	...	...	...	800	945	860	945	2145	2685	...	2515	2685	1860	2430
1150	...	...	...	...	...	...	430	860	570	630	1630	2285	...	1970	2285	1430	2060
1200	...	...	...	...	...	...	285	460	370	430	1285	1715	...	1515	1430	1085	1715
1250	...	...	...	...	...	...	...	...	...	...	915	1515	...	1170	1030	830	1345
1300	...	...	...	...	...	...	...	...	...	...	685	1145	...	885	770	660	1000
1350	...	...	...	...	...	...	...	...	...	...	515	860	...	685	570	485	660
1400	...	...	...	...	...	...	...	...	...	...	400	630	...	515	430	370	460
1450	...	...	...	...	...	...	...	...	...	...	285	485	...	400	345	260	315
1500	...	...	...	...	...	...	...	...	...	...	200	345	...	315	285	200	200

(Table 2 continues on next page ; Notes follow at end of Table)



Notes to Tables 2

NOTES: NUTECH OVERSEAS

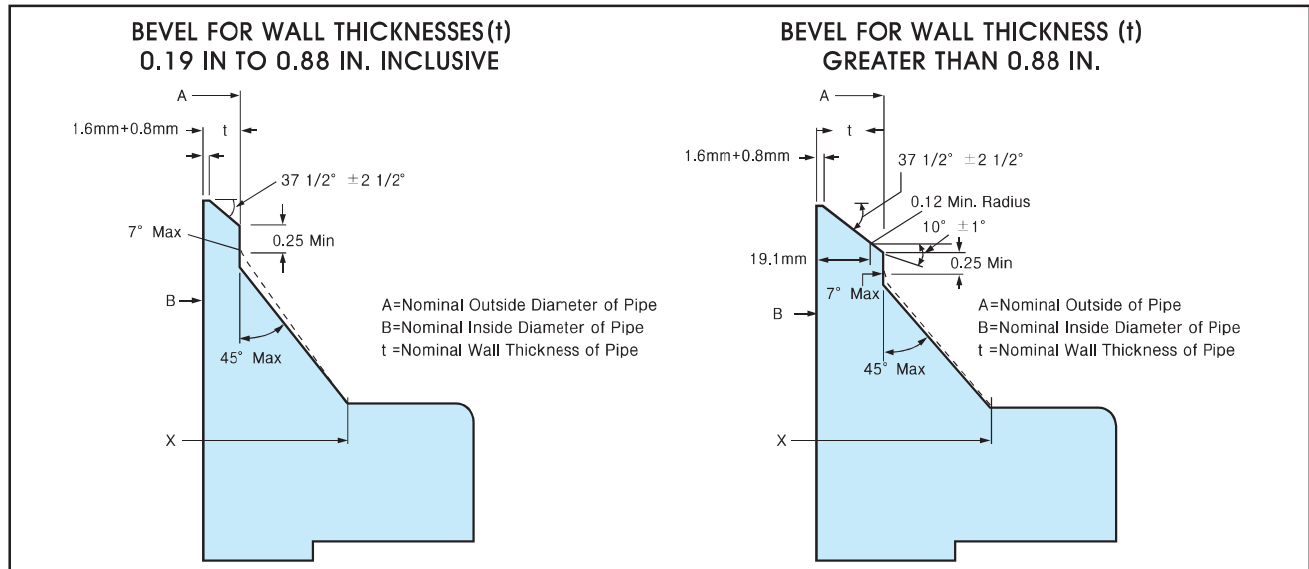
- (1) Provisions of Section 2 apply to all ratings.
- (2) Temperature notes for all Material Groups, Tables 2–75 and 1500 (see Table 1A for additional information and notes relating to specific materials):
 - (a) permissible but not recommended for prolonged use above about 800°F
 - (b) not to be used over 1000°F
 - (c) not to be used over 850°F
 - (d) not to be used over 650°F
 - (e) permissible but not recommended for prolonged use above about 850°F
 - (f) not to be used over 1050°F
 - (g) permissible but not recommended for prolonged use above about 1100°F
 - (h) not to be used over 1100°F
 - (i) not to be used over 800°F
 - (j) for service temperature 1050°F and above, should be used only when assurance is provided that grain size is not finer than ASTM No.6

Material Group	Materials (Spec. –Gr.)	Notes
1.1	A 105, A 216–WCB, A 515–70 A 516–70 A 350–LF2, A 537–Cl.1	(a)(b) (a)(c) (d)
1.2	A 203–B, A 203–E, A 216–WCC A 350–LF3, A 352–LC2, A 352–LC3 A 382–LCC	(a)(b) ... (d)
1.3	A 352–LCB A 203–A, A 203–D, A 515–65 A 516–65	(a) (a)(b) (a)(c)
1.4	A 515–60 A 516–60 A 350–LF1	(a)(b) (a)(c) (d)
1.5	A 182–F1, A 204–A, A 204–B, A 217–WC–1 A 352–LC1	(e)(b) (d)
1.7	A 204–C A 182–F2, A 217–WC4 A 217–WC5	(c) (b) (f)
1.9	A 182–F11, A 182–F12, A 387–11, Cl.2 A 217–WC6	(g) (h)
1.10	A 182–F22, A 387–22, Cl.2 A 217–WC9	(g) (h)
1.13	A 182–F5, A 182–F5a, A 217–C5	...
1.14	A 182–F9, A 217–C12	...

Material Group	Materials (Spec. –Gr.)	Notes
2.1	A 182–F304, A 182–F304H A 240–304, A 351 CF8 A 351–CF3 A 240–304H	 (i) ...
2.2	A 182–F316, A 182–F316H, A 240–316 A 240–317, A 351–CF8M A 351–CF3M A 240–316H	 (c) ...
2.3	A 182–F304L, A 240–304L A 182–F316L, A 240–316L	(i) (c)
2.4	A 182–F321, A 240–321 A 182–F321H, A 240–321H	(b) ...
2.5	A 182–F347, A 240–347 A 182–F347H, A 240–347H A 182–F348, A 240–348 A 182–F348H, A 240–F348H	(b) ... (b) ...
2.6	A 240–309S, A 351–CH8, A 351–CH20	...
2.7	A 182–F310, A 240–310S A 351–CK20	(j) ...



WELDING ENDS ANSI B16.5 FORGED FLANGES

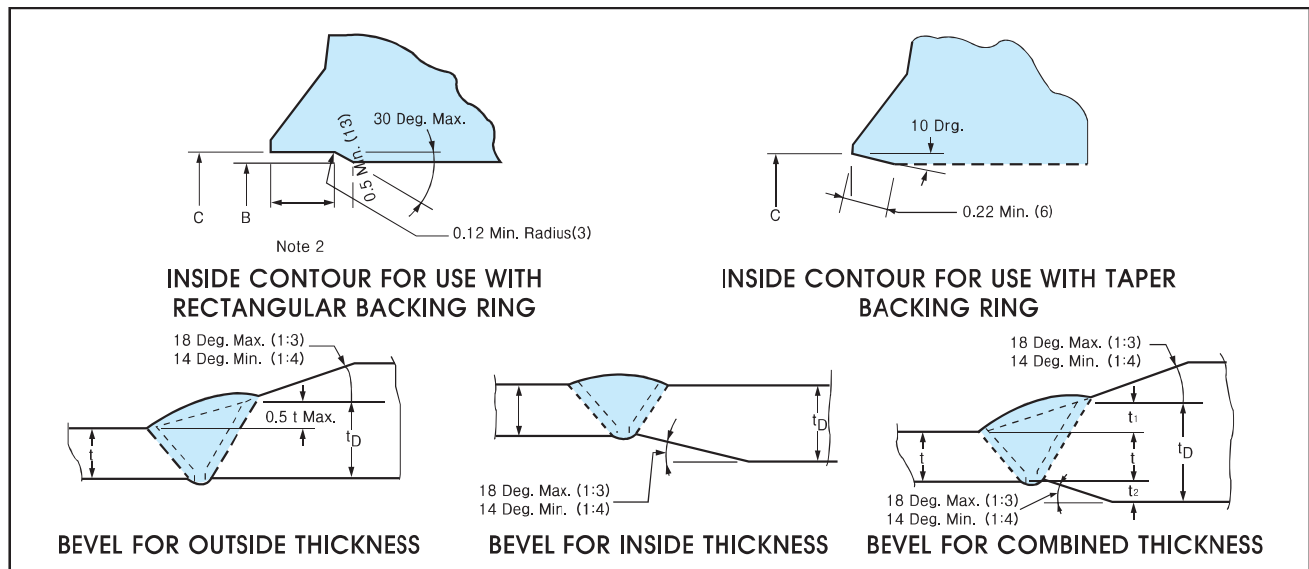


Notes:

When the thickness of the hub at the bevel is greater than that of the pipe to which the flange is joined and the additional thickness is provided on the outside diameter, a taper weld having a slop not exceeding 1 to 3 may be employed or, alternatively, the greater outside diameter may be tapered, at the same maximum slope or less, from a point on the welding bevel equal to the OD at the mating pipe. Similarly, when the greater thickness is provided on the inside of the flange, it shall be taper-bored from the welding end at a slope not exceeding 1 to 3.

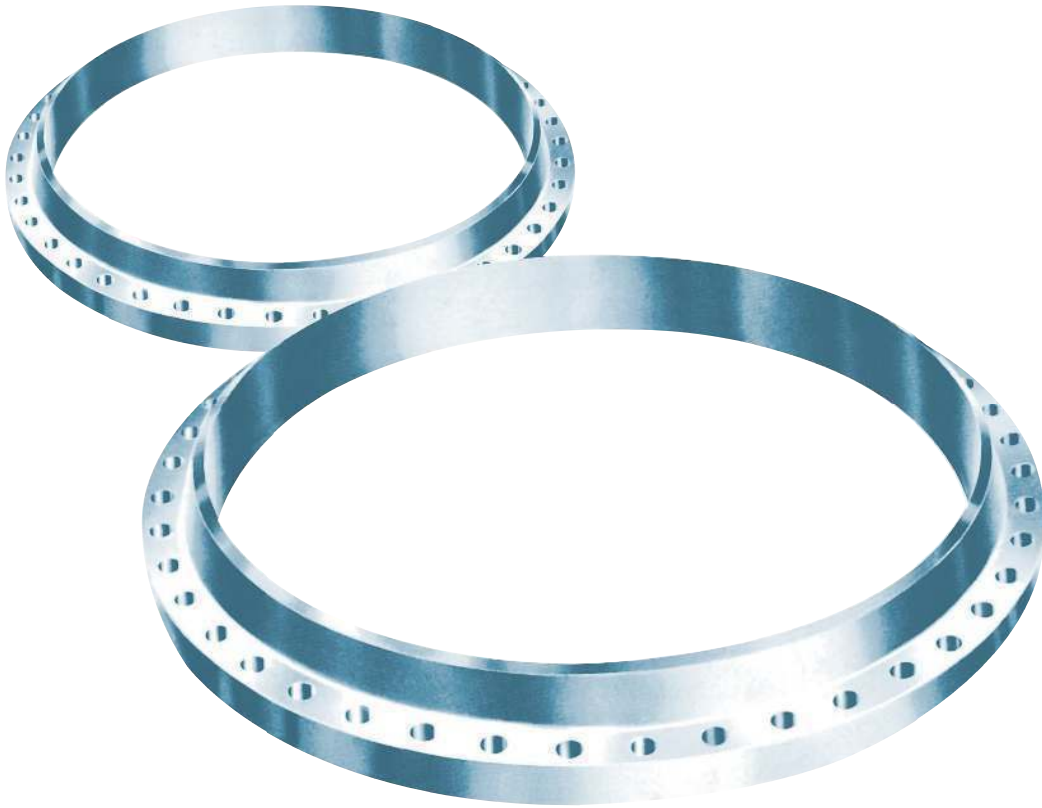
When flanges covered by this standard are intended for services with light wall, higher strength pipe, the thickness of the hub at the bevel may be greater than that of the pipe to which the flange is joined. Under these conditions a single taper hub may be provided and the outside diameter of the hub at the base (Dimension X) may also be modified.

The additional thickness may be provided on either inside or outside or partially on each side, but the total additional thickness shall not exceed one-half times the nominal wall thickness of intended mating pipe.



Notes: NUTECH OVERSEAS

- (1) When the materials joined have equal minimum specified yield strength, there shall be no restriction on the minimum (2) Neither t_1 , t_2 , nor their sum ($t_1 + t_2$) shall exceed $0.5t$.
- (3) When the minimum specified yield strength of the sections joined are unequal, the values shall be at least equal t time the ratio of minimum specified yield strength of the pipe to minimum specified yield strength of the flange.



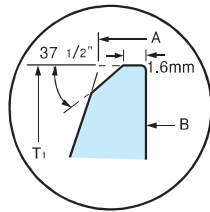
ANSI/ASME B16.47 SERIES B FLANGES (API 605)

- Class 75 Flanges
- Class 150 Flanges
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900 Flanges

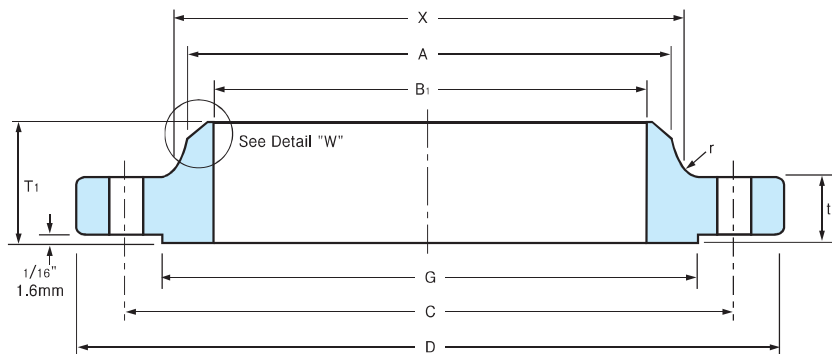


CLASS 75 FLANGES

ASME B16, 47 SER, B(AP1605)



Detail "W"
Typical Welding
end Preparation



Unit : mm

Nominal Pipe Size	Outside Diam	O.D. of Raised Face	Diam. at Base of Hub	Thick- ness	BORE			Length Thru Hub	Diam of Hub of Bevel	Radius at Base of Hub	DRILLING			Approximate Weight Pounds(Kg)
					Wall Thickness						Bolt Circle Diam.	Number of Holes	Diam. of Holes	
					6.35mm	9.5mm	12.7mm							
	D	G	X	t	B1			T1	A	r	C			
26	762	704.9	676.1	33.3	647.7	641.4	635.0	58.7	661.9	7.9	723.9	36	19.1	63.9 (29.01)
28	813	755.7	726.9	33.3	698.5	692.2	685.8	62.0	712.7	7.9	774.7	40	19.1	68.3 (31.01)
30	864	806.5	777.7	33.3	749.3	743.0	736.6	65.0	763.4	7.9	825.5	44	19.1	77.2 (35.05)
32	914	857.3	828.5	35.1	800.1	793.8	787.4	69.9	814.3	7.9	876.3	48	19.1	105.8 (48.03)
34	965	908.1	879.3	35.1	850.9	844.6	838.2	73.2	865.1	7.9	927.1	52	19.1	110.2 (50.03)
36	1034	965.2	935.0	36.6	901.7	895.4	889.0	85.9	915.9	9.7	992.1	40	22.4	136.7 (62.06)
38	1084	1016.0	985.8	38.1	952.5	946.2	939.8	88.9	966.7	9.7	1042.9	40	22.4	154.3 (70.05)
40	1135	1066.8	1036.6	38.1	1003.3	997.0	990.6	91.9	1017.5	9.7	1093.7	44	22.4	163.1 (74.05)
42	1186	1117.6	1087.4	39.6	1054.1	1047.8	1041.4	95.3	1068.3	9.7	1144.5	48	22.4	169.8 (77.09)
44	1251	1174.8	1140.0	42.9	1104.9	1049.4	1143.0	104.6	1119.1	9.7	1203.5	36	25.4	180.8 (82.08)
46	1302	1225.6	1190.8	44.5	1155.7	1149.4	1143.0	108.0	1169.9	9.7	1254.3	40	25.4	231.5 (105.01)
48	1353	1276.4	1241.6	46.0	1206.5	1200.2	1193.8	111.3	1220.7	9.7	1305.1	44	25.4	264.6 (120.03)
50	1403	1327.2	1293.9	47.8	1257.3	1251.0	1244.6	115.8	1271.5	9.7	1355.9	44	25.4	295.8 (134.28)
52	1457	1378.0	1344.7	47.8	1308.1	1301.8	1295.4	120.7	1322.3	9.7	1409.7	48	25.4	313.2 (142.18)
54	1508	1428.8	1397.0	49.3	1358.9	1352.6	1346.2	125.5	1373.1	9.7	1460.5	48	25.4	396.8 (180.15)
56	1575	1485.9	1450.8	50.8	1409.7	1403.4	1397.0	134.9	1423.9	11.2	1521.0	40	28.4	406.6 (184.58)
58	1626	1536.7	1501.6	52.3	1460.5	1454.2	1447.8	138.2	1474.7	11.2	1571.8	44	28.4	430.8 (195.56)
60	1676	1587.5	1552.4	55.6	1511.3	1505.0	1498.6	144.5	1525.5	11.2	1622.6	44	28.4	463.0 (210.20)

CLASS 150 FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam	O.D. of Raised Face	Diam. at Base of Hub	Thick- ness	BORE			Length Thru Hub	Diam of Hub of Bevel	Radius at Base of Hub	DRILLING			Approximate Weight Pounds(Kg)
					Wall Thickness						Bolt Circle Diam.	Number of Holes	Diam. of Holes	
					6.35mm	9.5mm	12.7mm							
	D	G	X	t	B1			T1	A	r	C			
26	786	711.2	684.3	41.1	647.7	641.4	635.0	88.9	661.9	9.7	744.5	36	22.4	114.6 (52.03)
28	837	762.0	735.1	44.5	698.5	692.2	685.8	95.3	712.7	9.7	795.3	40	22.4	127.9 (58.07)
30	887	812.8	787.4	44.5	749.3	743.0	736.6	100.1	763.5	9.7	846.1	44	22.4	143.4 (65.06)
32	941	863.6	839.7	46.0	800.1	793.8	787.4	108.0	814.3	9.7	900.2	48	22.4	187.4 (85.08)
34	1005	920.8	892.0	49.3	850.9	844.6	838.2	110.2	865.1	9.7	957.3	40	25.4	220.5 (100.11)
36	1057	971.6	944.6	52.3	901.7	895.4	889.0	117.3	915.9	9.7	1009.7	44	25.4	253.5 (115.09)
38	1124	1022.4	997.0	53.8	952.5	946.2	939.8	124.0	968.2	9.7	1069.8	40	28.4	297.5 (135.07)
40	1175	1079.5	1049.3	55.6	1003.3	997.0	990.6	128.5	1019.0	9.7	1120.6	44	28.4	330.7 (150.14)
42	1226	1130.3	1101.9	58.7	1054.1	1047.8	1041.4	133.4	1069.8	11.2	1171.4	48	28.4	363.8 (165.17)
44	1276	1181.1	1152.7	60.5	1104.9	1098.4	1092.2	136.7	1120.6	11.2	1222.2	52	28.4	440.9 (200.17)
46	1341	1234.9	1205.0	62.0	1155.7	1149.4	1143.0	144.5	1171.4	11.2	1284.2	40	31.8	463.0 (210.20)
48	1392	1289.1	1257.3	65.0	1206.5	1200.2	1193.8	149.4	1222.2	11.2	1335.0	44	31.8	529.1 (240.21)
50	1443	1339.9	1308.1	68.3	1257.3	1251.0	1244.6	153.9	1273.0	11.2	1385.8	48	31.8	552.4 (250.27)
52	1494	1390.7	1360.4	69.9	1308.1	1301.8	1295.4	157.2	1323.8	11.2	1436.6	52	31.8	585.9 (265.77)
54	1549	1441.5	1412.7	71.4	1358.9	1352.6	1346.2	162.1	1374.6	11.2	1492.3	56	31.8	683.4 (310.26)
56	1600	1492.3	1465.3	73.2	1409.7	1403.4	1397.0	166.6	1425.4	14.2	1543.1	60	31.8	674.8 (306.08)
58	1675	1543.1	1516.1	74.7	1460.5	1454.2	1447.8	174.8	1476.2	14.2	1611.4	48	35.1	810.6 (367.76)
60	1726	1600.2	1570.0	76.2	1511.3	1505.0	1498.6	179.3	1527.0	14.2	1662.2	52	35.1	903.9 (410.37)

Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B₁) of Welding Neck Flanges), refer to page 52.
- (2) Class 75 flanges will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T₁)
- (3) Dimensional tolerances are in accordance with ANSI B16.5



CLASS 300 FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam	O.D. of Raised Face	Diam. at Base of Hub	Thickness		BORE			Length Thru Hub	Diam of Hub of Bevel	Radius at Base of Hub	DRILLING			Approximate Weight Pounds(Kg)
						Wall Thickness						Bolt Circle Diam.	Number of Holes	Diam. of Holes	
				WNF	Blind	6.35mm	9.5mm	12.7mm							
	D	G	X	t		B1			T1	A	r	C			
26	867	736.6	701.5	88.9	88.9	647.7	641.4	635.0	144.5	665.2	14.2	803.1	32	35.1	440.9 (200.17)
28	921	787.4	755.7	88.9	88.9	698.5	692.2	685.8	149.4	716.0	14.2	857.3	36	35.1	463.0 (210.20)
30	991	844.6	812.8	93.7	93.7	749.3	743.0	736.6	158.0	768.4	14.2	920.8	36	38.1	595.2 (270.22)
32	1054	901.7	863.6	103.1	103.1	800.1	793.8	787.4	168.1	819.2	15.7	977.9	32	41.1	727.5 (330.29)
34	1108	952.5	917.4	103.1	103.1	850.9	844.6	838.2	173.0	870.0	15.7	1031.7	36	41.1	793.7 (360.34)
36	1171	1009.7	965.2	103.1	103.1	901.7	895.4	889.0	180.8	920.8	15.7	1089.2	32	44.5	903.9 (410.37)
38	1222	1060.5	1016.0	111.2	111.2	952.5	946.2	939.8	192.0	971.6	15.7	1140.0	36	44.5	1256.6 (570.50)
40	1273	1114.6	1066.8	115.8	115.8	1003.3	997.0	990.6	198.4	1022.4	15.7	1190.8	40	44.5	1455.0 (660.57)
42	1334	1168.4	1117.6	119.1	119.1	1054.1	1047.8	1041.4	204.7	1074.7	15.7	1244.5	36	47.8	1587.3 (720.63)
44	1384	1219.2	1173.2	127.0	127.0	1104.9	1098.6	1092.2	214.4	1125.5	15.7	1295.4	40	47.8	1763.7 (800.72)
46	1461	1270.0	1128.9	128.5	130.0	1155.7	1149.4	1143.0	222.3	1176.3	15.7	1365.3	36	50.8	2138.5 (970.88)
48	1511	1327.2	1277.9	128.5	134.8	1206.5	1200.2	1193.8	223.8	1227.1	15.7	1416.1	40	50.8	2182.5 (990.86)
50	1562	1378.0	1330.5	138.1	139.7	1257.3	1251.0	1244.6	235.0	1277.9	15.7	1466.9	44	50.8	2308.2 (1047.92)
52	1613	1428.8	1382.8	142.7	144.2	1308.1	1301.8	1295.4	242.8	1328.7	15.7	1517.7	48	50.8	2453.3 (1113.79)
54	1673	1479.6	1435.1	136.6	149.3	1358.9	1352.6	1346.2	239.8	1379.5	15.7	1577.8	48	50.8	2557.3 (1161.01)
56	1765	1536.7	1493.8	153.9	156.9	1409.7	1403.4	1397.0	268.2	1422.4	17.5	1651.0	36	60.5	2949.9 (1336.01)
58	1827	1593.9	1547.9	153.9	162.0	1460.5	1454.2	1447.8	274.6	1481.1	17.5	1712.0	40	60.5	3144.5 (1427.60)
60	1878	1651.0	1598.7	150.8	166.6	1511.3	1505.0	1498.6	271.5	1531.9	17.5	1763.8	40	60.5	3196.7 (1451.30)

CLASS 400 FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam	O.D. of Raised Face	Diam. at Base of Hub	Thickness		BORE			Length Thru Hub	Diam of Hub of Bevel	Radius at Base of Hub	DRILLING			Approximate Weight Pounds(Kg)	
				WNF	Blind	Wall Thickness						Bolt Circle Diam.	Number of Holes	Diam. of Holes		
						6.35mm	9.5mm	12.7mm								
	D	G	X	t		B1			T1	A	r	C				
26	850.9	711.2	668.8	88.9	88.9	647.7	641.4	635.0	149.3	660.4	11.1	781.0	28	38.1	—	—
28	914.4	762.0	739.6	95.2	95.2	698.5	692.2	685.8	158.7	711.2	12.7	838.2	24	41.1	—	—
30	971.5	819.1	793.7	101.6	101.6	749.3	743.0	736.6	169.9	762.0	12.7	895.3	28	41.1	—	—
32	1035.0	873.2	844.5	107.9	107.9	800.1	793.8	787.4	179.3	812.8	12.7	952.5	28	44.4	—	—
34	1085.8	927.1	898.6	111.2	111.2	850.9	844.6	838.2	187.4	863.6	14.2	1003.3	32	44.4	—	—
36	1155.7	980.9	952.5	119.1	119.1	901.7	895.4	889.0	200.1	914.4	14.2	1066.8	28	47.7	—	—

CLASS 600 FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam	O.D. of Raised Face	Diam. at Base of Hub	Thickness		BORE			Length Thru Hub	Diam of Hub of Bevel	Radius at Base of Hub	DRILLING			Approximate Weight Pounds(Kg)	
				WNF	Blind	Wall Thickness						Bolt Circle Diam.	Number of Holes	Diam. of Holes		
						6.35mm	9.5mm	12.7mm								
	D	G	X	t	B1			T1	A	r	C					
26	889.0	726.9	698.5	111.2	111.2	647.7	641.4	635.0	180.8	660.4	12.7	806.4	28	44.4	—	—
28	952.5	784.3	752.3	115.8	115.8	698.5	692.2	685.8	190.5	711.2	12.7	863.6	28	47.7	—	—
30	1022.3	841.2	806.4	125.4	127.0	749.3	743.0	736.6	204.7	762.0	12.7	927.1	28	50.8	—	—
32	1085.8	895.3	860.5	130.0	134.8	800.1	793.8	787.4	215.9	812.8	12.7	984.2	28	53.8	—	—
34	1162.0	952.5	914.4	141.2	144.2	850.9	844.6	838.2	233.4	863.6	14.2	1054.1	24	60.4	—	—
36	1212.8	1009.6	968.2	146.0	150.8	901.7	895.4	889.0	242.8	914.4	14.2	1104.9	28	60.4	—	—

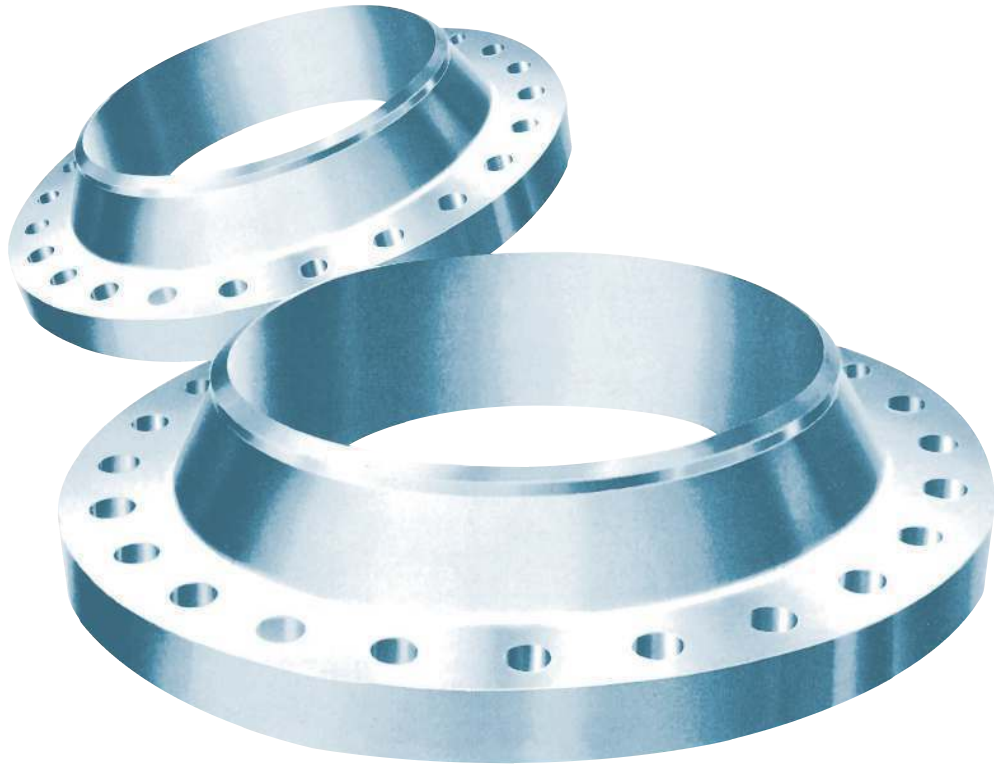
CLASS 900 FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam	O.D. of Raised Face	Diam. at Base of Hub	Thickness		BORE			Length Thru Hub	Diam of Hub of Bevel	Radius at Base of Hub	DRILLING			Approximate Weight Pounds(Kg)	
				WNF	Blind	Wall Thickness						Bolt Circle Diam.	Number of Holes	Diam. of Holes		
						6.35mm	9.5mm	12.7mm								
	D	G	X	t		B1			T1	A	r	C				
26	1022.3	762.0	742.9	134.8	153.9	647.7	641.4	635.0	258.8	666.4	11.1	901.7	20	66.5	—	—
28	1104.9	819.1	797.0	147.5	166.6	698.5	692.2	685.8	276.3	711.2	12.7	971.5	20	73.1	—	—
30	1181.1	876.3	850.9	155.4	176.0	749.3	743.0	736.6	289.0	762.0	12.7	1035.0	20	79.2	—	—
32	1238.2	927.1	908.0	160.2	185.6	800.1	793.8	787.4	303.2	812.8	12.7	1092.2	20	79.2	—	—
34	1314.4	990.6	962.1	171.4	195.0	850.9	844.6	838.2	319.0	863.6	14.2	1155.7	20	85.8	—	—
36	1346.2	1028.7	1016.0	172.9	201.6	901.7	895.4	889.0	325.3	914.4	14.2	1200.1	24	79.2	—	—

Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 52.
- (2) Class 300 flanges will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1)
- (3) Dimensional tolerances are in accordance with ANSI B16.5

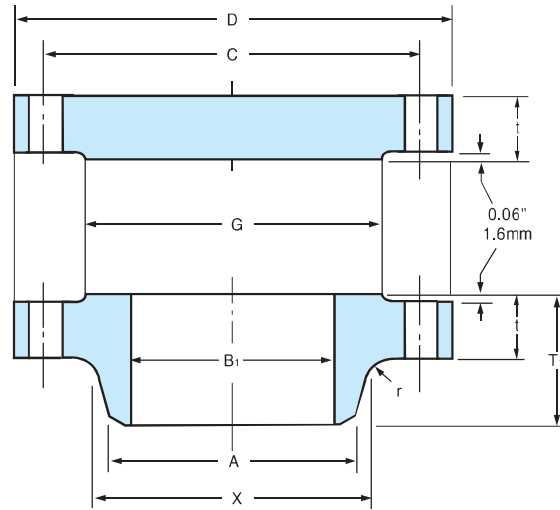


ANSI/ASME B16.47 SERIES A FLANGES (MSS SP44)

- Class 150 Flanges
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900 Flanges



CLASS 150 FLANGES



ANSI/ ASME B1 6.47 SERIES A FLANGES

Unit : mm

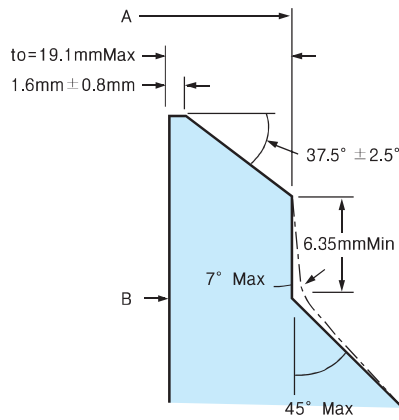
Nominal Pipe Size	Outside Diam. D	O.D. of Raised Face G	Diam. at Base of Hub X	Thickness t	BORE	
					Wall Thickness	
					9.5mm	12.7mm
					B ₁	
26	870	749.3	676.1	68.3	641.4	635.0
28	927	800.1	726.9	71.4	692.2	685.8
30	984	857.3	781.1	74.7	743.0	736.6
32	1060	914.4	831.9	80.8	793.8	787.4
34	1111	965.2	882.7	82.6	844.6	838.2
36	1168	1022.4	933.5	90.4	895.4	889.0
38	1238	1073.2	990.6	87.4	946.2	939.8
40	1289	1124.0	1041.4	90.4	997.0	990.6
42	1346	1193.8	1092.2	96.8	1047.8	1041.4
44	1403	1244.6	1143.0	101.6	1098.6	1092.2
46	1454	1295.4	1196.8	103.1	1149.4	1143.0
48	1511	1358.9	1247.6	108.0	1200.2	1193.8
50	1568	1409.7	1301.8	111.3	1251.0	1244.6
52	1626	1460.5	1352.6	115.8	1301.8	1295.4
54	1683	1511.3	1403.4	120.7	1352.6	1346.2
56	1746	1574.8	1457.5	124.0	1403.4	1397.0
58	1803	1625.6	1508.3	128.5	1454.2	1447.8
60	1854	1676.4	1559.1	131.8	1505.0	1498.6

Notes:

- (1) For the 'Bore' (B₁) other than wall thickness 0.375" (9.5mm) and 0.500" (12.7mm), refer to page 52.
- (2) Class 150 flanges Will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T₁)
- (3) Dimensional tolerances are in accordance with ANSI B16.5



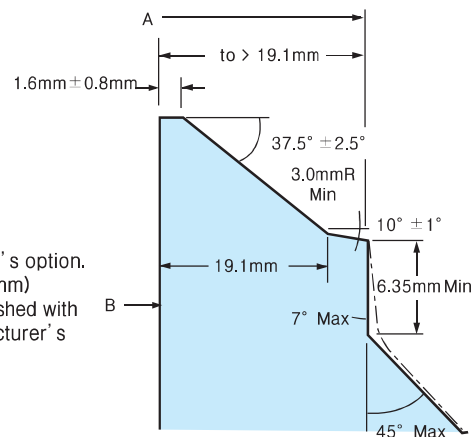
WELDING—ENDS FOR WELDING—NECK FLANGES



**BEVEL FOR WALL THICKNESSES (t)
0.19 IN. TO 0.88 IN. INCLUSIVE**

Notes:

- * Or 1 inch at manufacturer's option.
- ** Flanges sizes 24" (609.6mm) and smaller may be furnished with 37-1/2° bevel at manufacturer's option.



**BEVEL FOR WALL THICKNESSES (t)
GREATER THAN 0.88 IN.**

Unit : mm

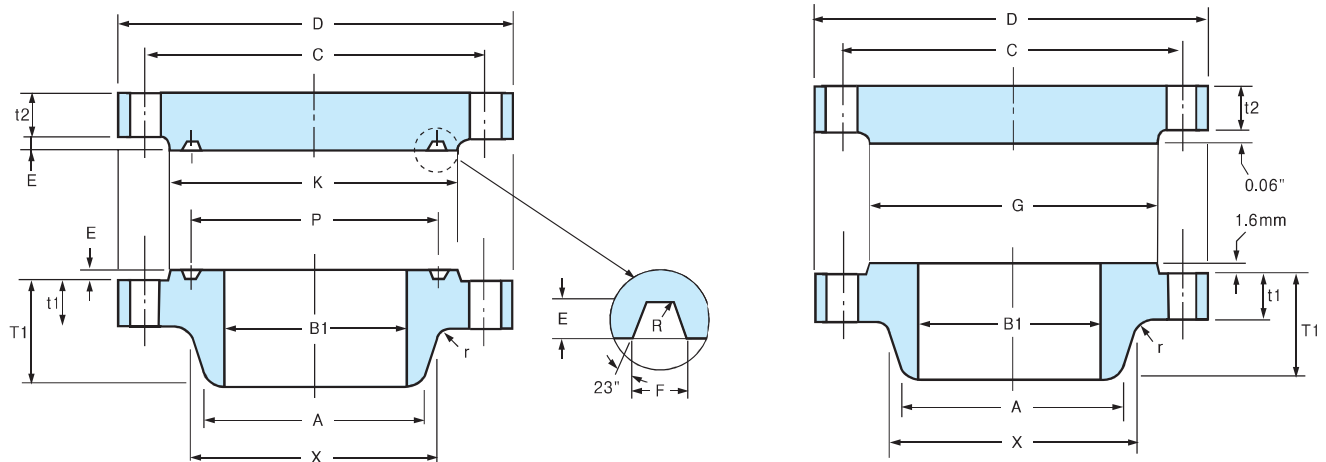
Nominal Pipe Size	Length thru Hub	Diam. of Hub Bevel	Radius of Fillet	DRILLING		
				Bolt Circle Diam.	Number of Holes	Diam. of Holes
	T ₁	A	r	C		
26	120.7	660.4	9.7	806.5	24	35.1
28	125.5	711.2	11.2	863.6	28	35.1
30	136.7	762.0	11.2	914.4	28	35.1
32	144.5	812.8	11.2	977.9	28	41.1
34	149.4	863.6	12.7	1028.7	32	41.1
36	157.0	914.4	12.7	1085.9	32	41.1
38	157.2	965.2	12.7	1149.4	32	41.1
40	163.6	1016.0	12.7	1200.2	36	41.1
42	171.5	1066.8	12.7	1257.3	36	41.1
44	177.8	1117.6	12.7	1314.5	40	41.1
46	185.7	1168.4	12.7	1365.3	40	41.1
48	192.0	1219.2	12.7	1422.4	44	41.1
50	203.2	1270.0	12.7	1479.6	44	47.8
52	209.6	1320.8	12.7	1536.7	44	47.8
54	215.9	1371.6	12.7	1593.9	44	47.8
56	228.6	1422.4	12.7	1651.0	48	47.8
58	235.0	1473.2	12.7	1708.0	48	47.8
60	239.8	1524.0	12.7	1759.0	52	47.8

(4) Maximum Pressure Rating for raised face flanges is 285 psi (19.5 BARS) at atmospheric temperature.

(5) Flange dimensions of size 12" (304.8mm) through 24" (609.6mm) flanges (except 22" (558.8mm)) are in accordance with ANSI B16.5



CLASS 300 FLANGES



ANSI/ ASME B1 6.47 SERIES A FLANGES

Unit : mm

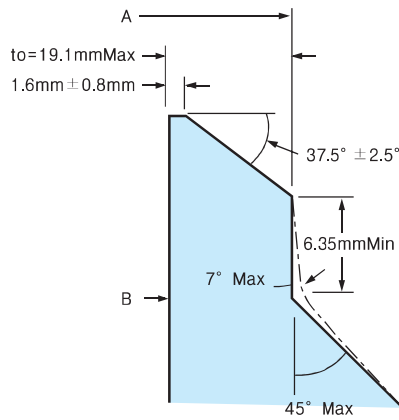
Nominal Pipe Size	Outside Diam.	O.D. of Raised Face	Diam. at Base of Hub	Thickness		BORE		Length Thru Hub	Diam. of Hub at Bevel	Radius of Fillet
						Wall Thickness				
				Welding Neck	Blind	9.5mm	12.7mm			
	D	G	X	t ₁	t ₂	B ₁		T ₁	A	r
26	972	749.3	720.9	79.2	84.1	641.4	635.0	184.2	660.4	9.7
28	1035	800.1	774.7	85.9	90.4	692.2	685.8	196.9	711.2	11.2
30	1092	857.3	827.0	91.9	95.3	743.0	736.6	209.6	762.0	11.2
32	1149	914.4	881.1	98.6	100.1	793.8	787.4	222.3	812.8	11.2
34	1207	965.2	936.8	101.6	104.6	844.6	838.2	231.6	863.6	12.7
36	1270	1022.4	990.6	104.6	111.3	895.4	889.0	241.3	914.4	12.7
38	1168	1028.7	993.6	108.0	108.0	946.2	939.8	180.8	965.2	12.7
40	1238	1085.9	1044.4	114.3	114.3	997.0	990.6	193.5	1016.0	12.7
42	1289	1136.7	1098.6	119.1	119.1	1047.8	1041.4	200.2	1066.8	12.7
44	1353	1193.8	1149.4	124.0	124.0	1198.6	1092.2	206.2	1117.6	12.7
46	1416	1244.6	1203.5	128.5	128.5	1149.4	1143.0	215.9	1168.4	12.7
48	1467	1301.8	1254.3	133.4	133.4	1200.2	1193.8	223.8	1219.2	12.7
50	1530	1358.9	1305.1	139.7	139.7	1251.0	1244.6	231.6	1270.0	12.7
52	1581	1409.7	1355.9	144.5	144.5	1301.8	1295.4	238.3	1320.8	12.7
54	1657	1466.9	1409.7	152.4	152.4	1352.6	1346.2	252.5	1371.6	12.7
56	1708	1517.7	1463.5	153.9	153.9	1403.4	1397.0	260.4	1422.4	12.7
58	1759	1574.8	1514.3	158.8	158.8	1454.2	1447.8	266.7	1493.2	12.7
60	1810	1625.6	1565.1	163.6	163.6	1505.0	1498.6	273.1	1524.0	12.7

Notes:

- (1) For the 'Bore' (B₁) other than wall thickness 0.375" (9.5mm) and 0.500" (12.7mm), refer to page 52.
- (2) Class 300 flanges will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T₁)
- (3) Dimensional tolerances are in accordance with ANSI B16.5



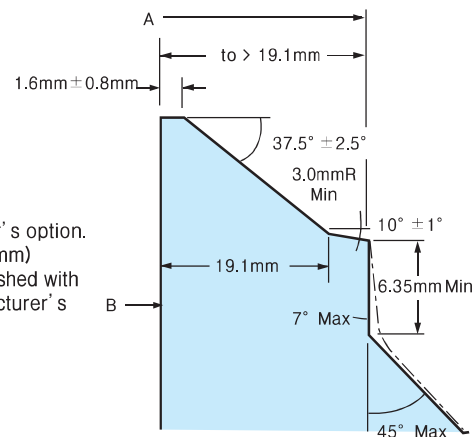
WELDING—ENDS FOR WELDING—NECK FLANGES



**BEVEL FOR WALL THICKNESSES (t)
0.19 IN. TO 0.88 IN. INCLUSIVE**

Notes:

- * Or 1 inch at manufacturer's option.
- ** Flanges sizes 24" (609.6mm) and smaller may be furnished with 37-1/2° bevel at manufacturer's option.



**BEVEL FOR WALL THICKNESSES (t)
GREATER THAN 0.88 IN.**

Unit : mm

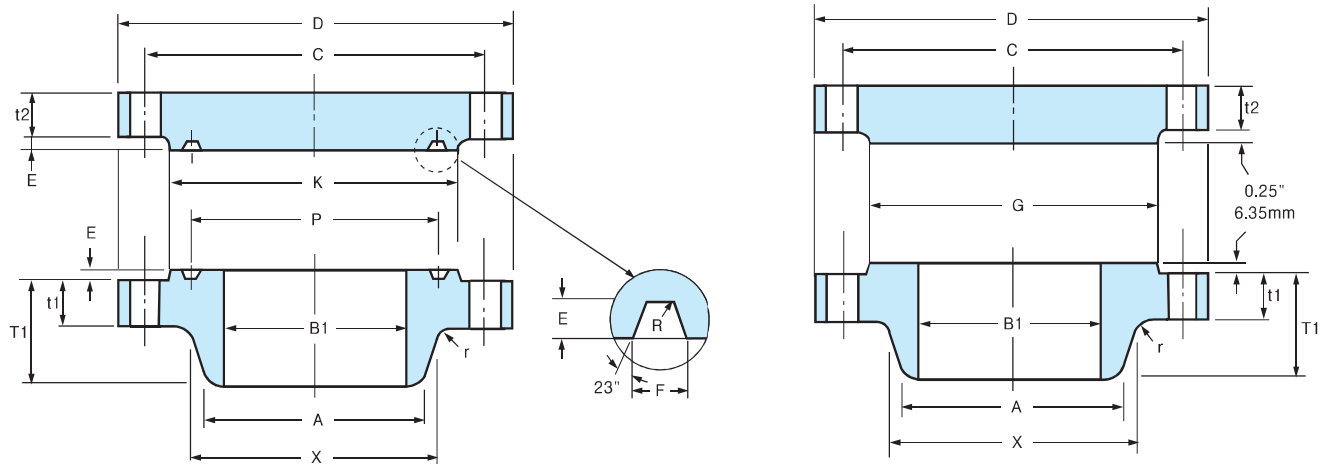
Nominal Pipe Size	DRILLING			Pitch Diam.	GROOVE DIMENSIONS			Diam. of Raised Face	Ring and Groove Number
	Bolt Circle Diam.	Number of Holes	Diam. of Holes		Width	Depth	Radius		
	C								
26	876.3	28	44.5	749.3	19.8	12.7	1.5	809.8	R93
28	939.8	28	44.5	800.1	19.8	12.7	1.5	860.6	R94
30	997.0	28	47.8	857.3	19.8	12.7	1.5	917.4	R95
32	1054.1	28	50.8	914.4	23.0	14.3	1.5	984.3	R96
34	1104.9	28	50.8	965.2	23.0	14.3	1.5	1035.1	R97
36	1168.4	32	53.8	1022.4	23.0	14.3	1.5	1092.2	R98
38	1092.2	32	41.1						
40	1155.7	32	44.5						
42	1206.5	32	44.5						
44	1263.7	32	47.8						
46	1320.8	28	50.8						
48	1371.6	32	50.8						
50	1428.8	32	53.8						
52	1479.6	32	53.8						
54	1549.4	28	60.5						
56	1600.2	28	60.5						
58	1651.0	32	60.5						
60	1701.8	32	60.5						

(4) Maximum Pressure Rating for raised face flanges is 740 psi (51 BARS) at atmospheric temperature.

(5) Flange dimensions of size 12" (304.8mm) through 24" (609.6mm) flanges (except 22" (558.8mm)) are in accordance with ANSI B16.5



CLASS 400 FLANGES



ANSI/ ASME B1 6.47 SERIES A FLANGES

Unit : mm

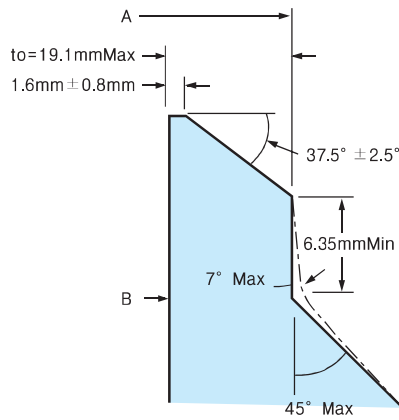
Nominal Pipe Size	Outside Diam.	O.D. of Raised Face	Diam. at Base of Hub	Thickness		BORE		Length Thru Hub	Diam. of Hub at Bevel	Radius of Fillet
						Wall Thickness				
				Welding Neck	Blind	9.5mm	12.7mm			
	D	G	X	t ₁	t ₂	B ₁		T ₁	A	r
26	972	749.3	726.9	88.9	98.6	641.4	635.0	193.5	660.4	11.2
28	1035	800.1	782.6	95.3	104.6	692.2	685.8	206.2	711.2	12.7
30	1092	857.3	836.7	101.6	111.3	743.0	736.6	218.9	762.0	12.7
32	1149	914.4	889.0	108.0	115.8	793.8	787.4	231.6	812.8	12.7
34	1207	965.2	944.6	111.3	122.2	844.6	838.2	241.3	863.6	14.2
36	1270	1022.4	1000.3	114.3	128.5	895.4	889.0	251.0	914.4	14.2
38	1207	1035.1	1003.3	124.0	124.0	946.2	939.8	206.2	965.2	14.2
40	1270	1092.2	1054.1	130.0	130.0	997.0	990.6	215.9	1016.0	14.2
42	1321	1143.0	1107.9	133.4	133.4	1047.8	1041.4	223.8	1066.8	14.2
44	1384	1200.2	1158.7	139.7	139.7	1098.6	1092.2	233.4	1117.6	14.2
46	1441	1257.3	1212.9	146.1\	146.1	1149.4	1143.0	244.3	1168.4	14.2
48	1511	1308.1	1267.0	152.4	152.4	1200.2	1193.8	257.0	1219.2	14.2
50	1568	1361.9	1320.8	157.2	158.8	1251.0	1244.6	268.2	1270.0	14.2
52	1619	1412.7	1371.6	162.1	163.6	1301.8	1295.4	276.4	1320.8	14.2
54	1702	1470.2	1425.4	169.9	171.5	1352.6	1346.2	289.1	1371.6	14.2
56	1753	1527.0	1479.6	174.8	176.3	1403.4	1397.0	298.5	1422.4	14.2
58	1803	1577.8	1530.4	177.8	180.8	1454.2	1447.8	306.3	1493.2	14.2
60	1886	1635.3	1584.5	185.7	189.0	1505.0	1498.6	319.0	1524.0	14.2

Notes:

- (1) For the 'Bore' (B₁) other than wall thickness 0.375" (9.5mm) and 0.500" (12.7mm), refer to page 52.
- (2) Class 400 flanges will be furnished with 0.25" (6.4mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁)
- (3) Dimensional tolerances are in accordance with ANSI B16.5



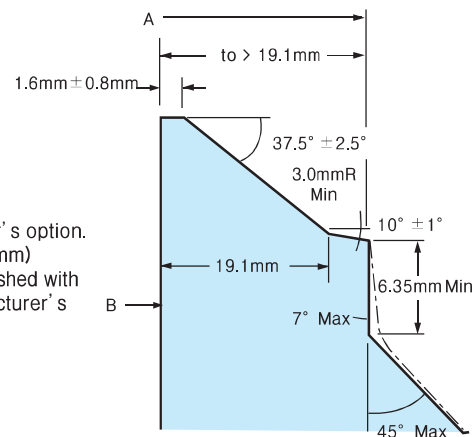
WELDING—ENDS FOR WELDING—NECK FLANGES



**BEVEL FOR WALL THICKNESSES (t)
0.19 IN. TO 0.88 IN. INCLUSIVE**

Notes:

- * Or 1 inch at manufacturer's option.
- ** Flanges sizes 24" (609.6mm) and smaller may be furnished with 37-1/2° bevel at manufacturer's option.



**BEVEL FOR WALL THICKNESSES (t)
GREATER THAN 0.88 IN.**

Unit : mm

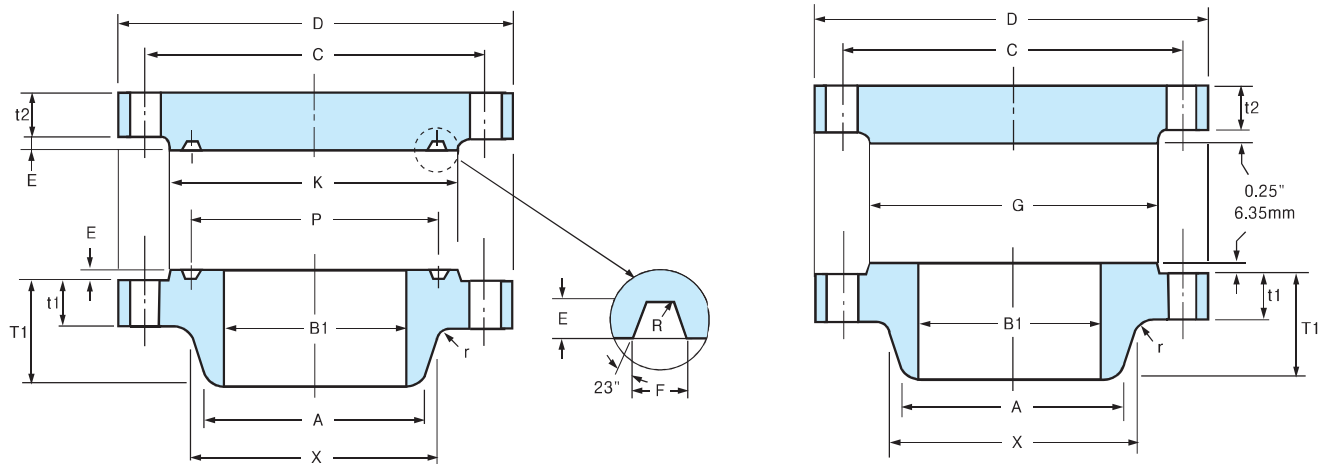
Nominal Pipe Size	DRILLING			Pitch Diam.	GROOVE DIMENSIONS			Diam. of Raised Face	Ring and Groove Number
	Bolt Circle Diam.	Number of Holes	Diam. of Holes		Width	Depth	Radius		
	C								
26	876.3	28	47.8	749.3	19.8	12.7	1.5	809.8	R93
28	939.8	28	50.8	800.1	19.8	12.7	1.5	860.6	R94
30	997.0	28	53.8	857.3	19.8	12.7	1.5	917.4	R95
32	1047.8	28	53.8	914.4	23.0	14.3	1.5	984.3	R96
34	1104.9	28	53.8	965.2	23.0	14.3	1.5	1035.1	R97
36	1168.4	32	53.8	1022.4	23.0	14.3	1.5	1092.2	R98
38	1117.6	32	47.8						
40	1174.8	32	50.8						
42	1225.6	32	50.8						
44	1282.7	32	53.8						
46	1339.9	36	53.8						
48	1403.4	28	60.5						
50	1460.5	32	60.5						
52	1511.3	32	60.5						
54	1581.2	28	66.5						
56	1632.0	32	66.5						
58	1682.8	32	66.5						
60	1752.6	32	73.2						

(4) Maximum Pressure Rating for raised face flanges is 985 psi (68 BARS) at atmospheric temperature.

(5) Flange dimensions of size 12" (304.8mm) through 24" (609.6mm) flanges (except 22" (558.8mm)) are in accordance with ANSI B16.5



CLASS 600 FLANGES



ANSI/ ASME B1 6.47 SERIES A FLANGES

Unit : mm

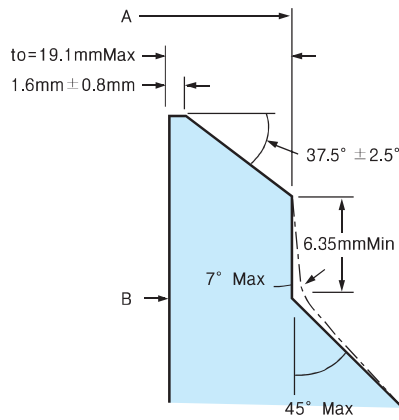
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O.D. of Raised Face	Thickness		BORE		Length Thru Hub	Diam. of Hub at Bevel	Radius of Fillet
						Wall Thickness				
				Welding Neck	Blind	9.5mm	12.7mm			
	D	X	G	t ₁	t ₂	B ₁		T ₁	A	r
26	1016	747.8	749.3	108.0	125.5	641.4	635.0	222.3	660.4	12.7
28	1073	803.1	800.1	111.3	131.8	692.2	685.8	235.0	711.2	12.7
30	1130	862.1	857.3	114.3	139.7	743.0	736.6	247.7	762.0	12.7
32	1194	917.4	914.4	117.3	147.6	793.8	787.4	260.4	812.8	12.7
34	1245	973.1	965.2	120.7	153.9	844.6	838.2	269.7	863.6	14.2
36	1314	1031.7	1022.4	124.0	162.1	895.4	889.0	282.4	914.4	14.2
38	1270	1022.4	1054.1	152.4	155.4	946.2	939.8	254.0	965.2	14.2
40	1321	1073.2	1111.3	158.8	162.1	997.0	990.6	263.7	1016.0	14.2
42	1403	1127.3	1168.4	168.1	171.5	1047.8	1041.4	279.4	1066.8	14.2
44	1454	1181.1	1225.6	173.0	177.8	1098.6	1092.2	289.1	1117.6	14.2
46	1511	1234.9	1276.4	179.3	185.7	1149.4	1143.0	300.0	1168.4	14.2
48	1594	1289.1	1333.5	189.0	195.3	1200.2	1193.8	316.0	1219.2	14.2
50	1670	1343.2	1384.3	196.9	203.2	1251.0	1244.6	328.7	1270.0	14.2
52	1721	1394.0	1435.1	203.2	209.6	1301.8	1295.4	336.6	1320.8	14.2
54	1778	1447.8	1492.3	209.6	217.4	1352.6	1346.2	349.3	1371.6	14.2
56	1854	1501.6	1543.1	217.4	225.6	1403.4	1397.0	362.0	1422.4	15.7
58	1905	1552.4	1600.2	222.3	231.6	1454.2	1447.8	369.8	1473.2	15.7
60	1994	1609.9	1657.4	233.4	242.8	1505.0	1498.6	388.9	1524.0	17.5

Notes:

- (1) For the 'Bore' (B₁) other than wall thickness 0.375" (9.5mm) and 0.500" (12.7mm), refer to page 52.
- (2) Class 600 flanges will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁)
- (3) Dimensional tolerances are in accordance with ANSI B16.5



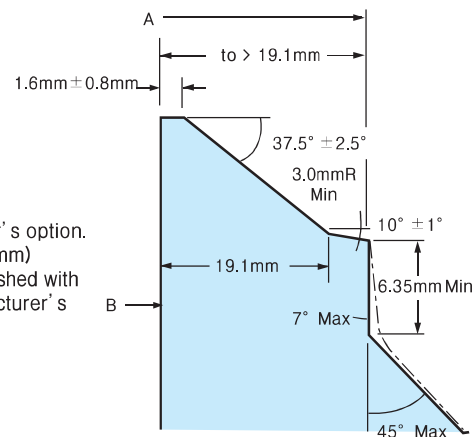
WELDING—ENDS FOR WELDING—NECK FLANGES



**BEVEL FOR WALL THICKNESSES (t)
0.19 IN. TO 0.88 IN. INCLUSIVE**

Notes:

- * Or 1 inch at manufacturer's option.
- ** Flanges sizes 24" (609.6mm) and smaller may be furnished with 37-1/2° bevel at manufacturer's option.



**BEVEL FOR WALL THICKNESSES (t)
GREATER THAN 0.88 IN.**

Unit : mm

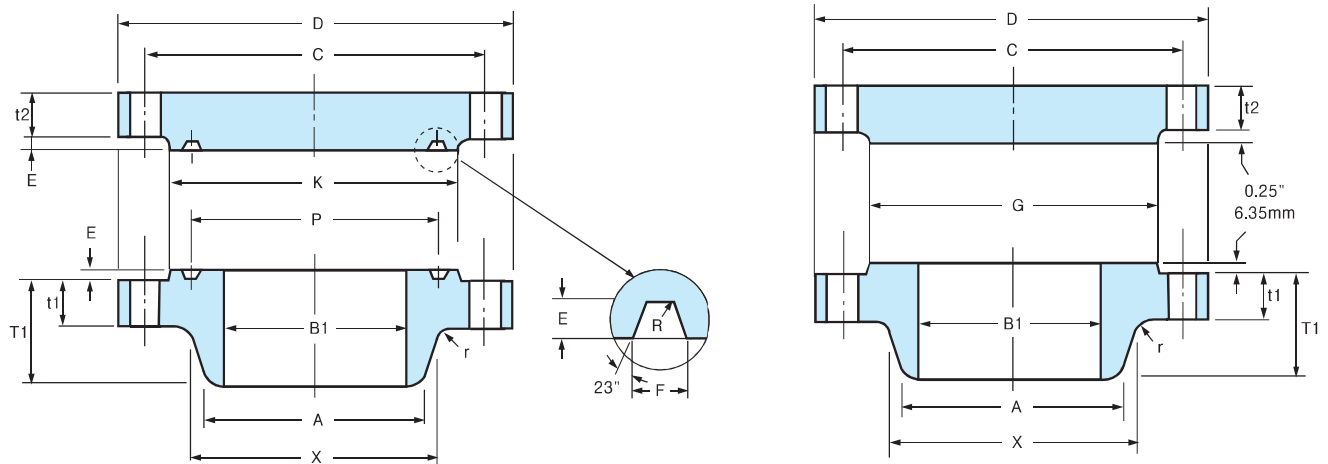
Nominal Pipe Size	DRILLING			Pitch Diam.	GROOVE DIMENSIONS			Diam. of Raised Face	Ring and Groove Number
	Bolt Circle Diam.	Number of Holes	Diam. of Holes		Width	Depth	Radius		
	C								
26	914.4	28	50.8	749.3	19.8	12.7	1.5	809.8	R93
28	965.2	28	53.8	800.1	19.8	12.7	1.5	860.6	R94
30	1022.4	28	53.8	857.3	19.8	12.7	1.5	917.4	R95
32	1079.5	28	60.5	914.4	23.0	14.3	1.5	984.3	R96
34	1130.3	28	60.5	965.2	23.0	14.3	1.5	1035.1	R97
36	1193.8	28	66.5	1022.4	23.0	14.3	1.5	1092.2	R98
38	1162.1	28	60.5						
40	1212.9	32	60.5						
42	1282.7	28	66.5						
44	1333.5	32	66.5						
46	1390.7	32	66.5						
48	1460.5	32	73.2						
50	1524.0	28	79.2						
52	1574.8	32	79.2						
54	1632.0	32	79.2						
56	1695.5	32	85.9						
58	1746.3	32	85.9						
60	1822.5	28	91.9						

(4) Maximum Pressure Rating for raised face flanges is 1480 psi (102.1 BARS) at atmospheric temperature.

(5) Flange dimensions of size 12" (304.8mm) through 24" (609.6mm) flanges (except 22" (558.8mm)) are in accordance with ANSI B16.5



CLASS 900 FLANGES



ANSI/ ASME B1 6.47 SERIES A FLANGES

Unit : mm

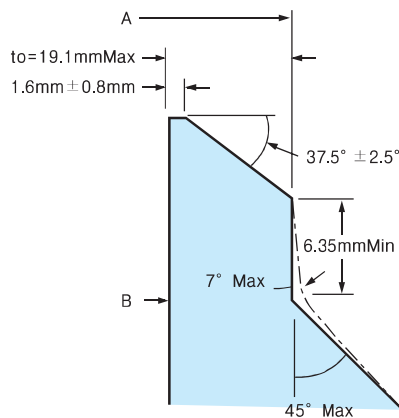
Nominal Pipe Size	Outside Diam.	Diam. at Base of Hub	O.D. of Raised Face	Thickness		BORE		Length Thru Hub	Diam. of Hub at Bevel	Radius of Fillet
						Wall Thickness				
				Welding Neck	Blind	9.5mm	12.7mm			
	D	X	G	t ₁	t ₂	B ₁		T ₁	A	r
26	1086	774.7	749.3	139.7	160.3	641.4	635.0	285.8	660.4	11.2
28	1168	831.9	800.1	142.7	171.5	692.2	685.8	298.5	711.2	12.7
30	1232	889.0	857.3	149.4	182.4	743.0	736.6	311.2	762.0	12.7
32	1314	946.2	914.4	158.8	193.5	793.8	787.4	330.2	812.8	12.7
34	1397	1006.3	965.2	165.1	204.7	844.6	838.2	349.3	863.6	14.2
36	1461	1063.8	1022.4	171.5	214.4	895.4	889.0	362.0	914.4	14.2
38	1461	1073.2	1098.6	190.5	215.9	946.2	939.8	352.6	965.2	19.1
40	1511	1127.3	1162.1	196.9	223.8	997.0	990.6	363.5	1016.0	20.6
42	1562	1176.3	1212.9	206.2	231.6	1047.8	1041.4	371.3	1066.8	20.6
44	1648	1234.9	1270.0	214.4	242.8	1198.6	1092.2	390.7	1117.6	22.4
46	1734	1292.4	1333.5	225.6	275.8	1149.4	1143.0	411.0	1168.4	22.4
48	1784	1343.2	1384.3	233.4	263.7	1200.2	1193.8	419.1	1219.2	23.9

Notes:

- (1) For the 'Bore' (B₁) other than Wall Thickness 0.375" (9.5mm) and 0.500" (12.7mm), refer to page 52.
- (2) Class 900 flanges will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T₁)
- (3) Dimensional tolerances are in accordance with ANSI B16.5



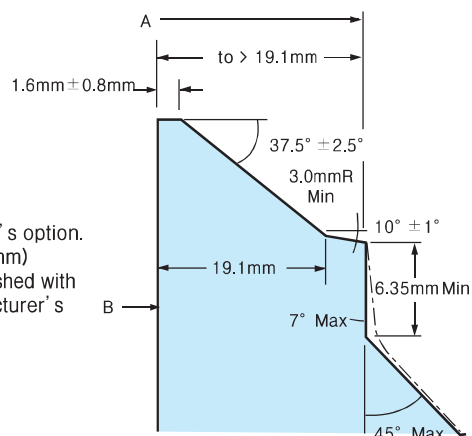
WELDING—ENDS FOR WELDING—NECK FLANGES



**BEVEL FOR WALL THICKNESSES (t)
0.19 IN. TO 0.88 IN. INCLUSIVE**

Notes:

- * Or 1 inch at manufacturer's option.
- ** Flanges sizes 24" (609.6mm) and smaller may be furnished with 37-1/2° bevel at manufacturer's option.



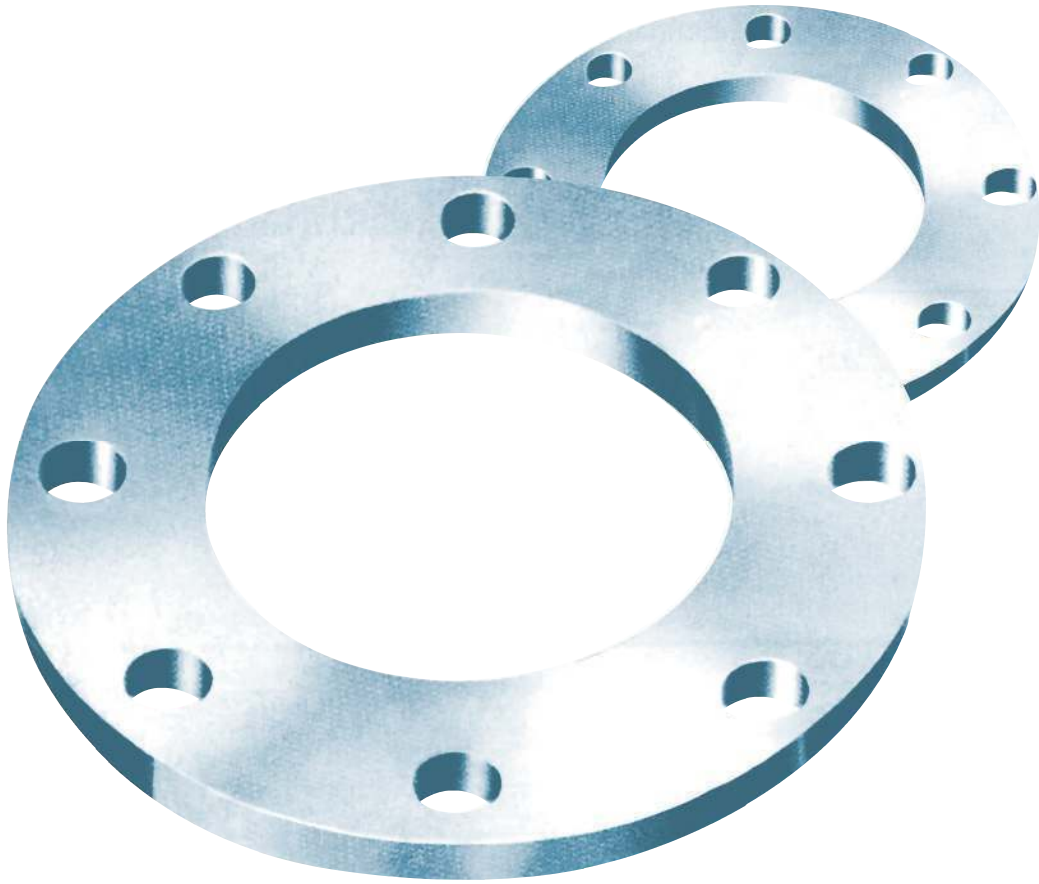
**BEVEL FOR WALL THICKNESSES (t)
GREATER THAN 0.88 IN.**

Unit : mm

Nominal Pipe Size	DRILLING			Pitch Diam.	GROOVE DIMENSIONS			Diam. of Raised Face	Ring and Groove Number
	Bolt Circle Diam.	Number of Holes	Diam. of Holes		Width	Depth	Radius		
	C								
26	925.5	20	73.2	749.3	30.2	17.5	2.3	831.9	R100
28	1022.4	20	79.2	800.1	33.3	17.5	2.3	889.0	R101
30	1085.9	20	79.2	857.3	33.3	17.5	2.3	946.2	R102
32	1155.7	20	85.9	914.4	33.3	17.5	2.3	1003.3	R103
34	1225.6	20	91.9	965.2	36.5	20.6	2.3	1066.8	R104
36	1289.1	20	91.9	1022.4	36.5	20.6	2.3	1124.0	R105
38	1289.1	20	91.9						
40	1339.9	24	91.9						
42	1390.7	24	91.9						
44	1463.5	24	98.6						
46	1536.7	24	104.6						
48	1587.5	24	104.6						

(4) Maximum Pressure Rating for raised face flanges is 2220 psi (153.1 BARS) at atmospheric temperature.

(5) Flange dimensions of size 12" (304.8mm) through 24" (609.6mm) flanges are in accordance with ANSI B16.5.



AWWA FLANGES

- General Specifications
- Class B&D Flanges Table 2
- Class B&D Flanges Table 3
- Class E Flanges Table 4



GENERAL SPECIFICATIONS

AWWA C207 FLANGES

1. Standard Finishes for Contact Face of AWWA Flange

Flanges of all classes shall be flat faced—that is, without projection or raised face. The dimensions given for thickness are minimum. The flanges shall be faced smooth or may have a serrated finish of approximately 32 serrations per inch, approximately 1/64 in. deep. Serrations may be either spiral or concentric.

2. Dimensional Tolerances for AWWA Flanges

Dimension		Tolerance in.
Bore		+1/16-0
Outside diameter		± 1/8
Thickness	18 in. and smaller	+1/8-0
	20 in. and larger	+3/16-0
Length through Hub		+3/16-1/16
Bolt Circle Diameter		± 1/16

Note: For other dimensional tolerances, see ANSI B16.5, page 47.

3. Bolting

Bolts and nuts shall be carbon steel ASTM A307, Grades A or B. Bolts shall have regular unfinished square or hexagonal heads, and nuts shall have regular square or hexagonal dimensions all in accordance with ANSI B18.21 for wrench head bolts and nuts and wrench openings.

All bolts and nuts shall be threaded in accordance with ANSI B1.1 for screw threads, coarse-thread series, Class 2A and 2B fit.

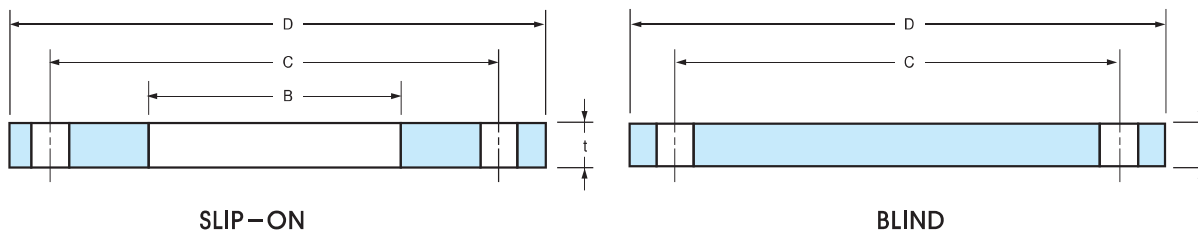
4. Gaskets

These standards are predicated on the user of either a cloth-inserted rubber gasket 1/16 in. thick or an asbestos ring gasket that is either 1/16 in. or 1/8 in. thick, at the purchaser's option. The gasket shall extend from the inside diameter of the flange to at least the inside edge of the bolt holes, or it may.



CLASS B & D FLANGES TABLE 2

AWWA Standard Steel Ring Flanges, Class B(86psi) and Class D (175–150 psi)



AWWA C207

Unit : mm

Nominal Pipe Size	Outside Diam.	Bore	Thickness		DRILLING			
					Bolt Circle Diam. C	Number of Holes	Diam. of Bolt Holes	
			Class B(t)	Class D(t)			Class B	Class D
4	228.6	116.1	15.9	15.9	190.5	8	19.1	19.1
5	254.0	143.8	15.9	15.9	215.9	8	19.1	22.2
6	279.4	170.7	17.5	17.5	241.3	8	19.1	22.2
8	342.9	221.5	17.5	17.5	298.5	8	19.1	22.2
10	406.4	276.4	17.5	17.5	362.0	12	19.1	25.4
12	482.6	327.2	17.5	20.6	431.8	12	19.1	25.4
14	533.4	360.4	17.5	23.8	476.3	12	22.2	28.6
16	596.9	411.2	17.5	25.4	539.8	16	22.2	28.6
18	635.0	462.0	17.5	27.0	577.9	16	22.2	31.8
20	698.5	512.8	17.5	28.6	635.0	20	22.2	31.8
22	749.3	563.6	19.1	30.2	692.2	20	22.2	34.9
24	812.8	614.4	19.1	31.8	749.3	20	22.2	34.9
26	870.0	665.2	20.6	33.3	806.5	24	22.2	34.9
28	927.1	716.0	22.2	33.3	863.6	28	22.2	34.9
30	984.3	766.8	22.2	34.9	914.4	28	25.4	34.9
32	1,060.5	817.6	23.8	38.1	977.9	28	25.4	41.3
34	1,111.3	868.4	23.8	38.1	1,028.7	32	25.4	41.3
36	1,168.4	919.2	25.4	41.3	1,085.9	32	25.4	41.3
38	1,238.3	970.0	25.4	41.3	1,149.4	32	25.4	41.3
40	1,289.1	1,020.8	25.4	41.3	1,200.2	36	25.4	41.3
42	1,346.2	1,071.6	28.6	44.5	1,257.3	36	28.6	41.3
44	1,403.4	1,122.4	28.6	44.5	1,314.5	40	28.6	41.3
46	1,454.2	1,173.2	28.6	44.5	1,365.3	40	28.6	41.3
48	1,511.3	1,224.0	31.8	44.5	1,422.4	44	28.6	41.3
50	1,568.5	1,274.8	31.8	50.8	1,479.6	44	31.8	47.6
52	1,625.6	1,325.6	31.8	50.8	1,536.7	44	31.8	47.6
54	1,682.8	1,376.4	34.9	54.0	1,593.9	44	34.9	47.6
60	1,854.2	1,528.8	38.1	57.2	1,759.0	52	34.9	47.6
66	2,032.0	1,681.2	41.3	63.5	1,930.4	52	34.9	47.6
72	2,197.1	1,833.6	44.5	66.7	2,095.5	60	34.9	47.6
78	2,362.2	1,986.0	50.8	69.9	2,260.6	64	41.3	54.0
84	2,533.7	2,138.4	50.8	69.9	2,425.7	64	41.3	54.0
90	2,705.1	2,290.8	57.2	76.2	2,590.8	68	47.6	60.3
96	2,876.6	2,443.2	57.2	76.2	2,755.9	68	47.6	60.3
102	3,048.0	2,595.6	63.5	82.6	2,908.3	72	54.0	66.7
108	3,219.5	2,748.0	63.5	82.6	3,067.1	72	54.0	66.7
114	3,390.9	2,900.4	69.9	88.9	3,219.5	76	60.3	73.0
120	3,562.4	3,052.8	69.9	88.9	3,371.9	76	60.3	73.0

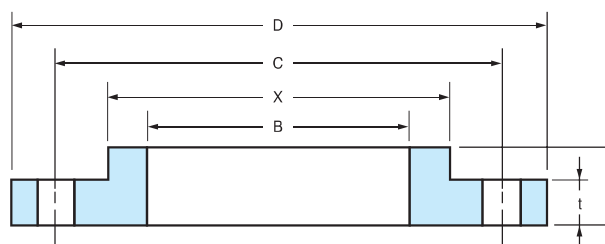
Notes:

- (1) For standard finishes for contact face, refer to page 46.
- (2) The 'Bore' (B) shall be $\frac{3}{16}$ in. larger than the nominal outside diameter of the pipe, unless otherwise specified.



CLASS B & D FLANGES TABLE 3

AWWA Standard Steel Hub Flanges, Class B(86psi) and Class D (175–150 psi)



SLIP-ON

AWWA C207

Unit : mm

Nominal Pipe Size	Outside Diam.	Bore	Thickness	Length Through Hub	Diam. of Hub at Base	DRILLING			
						Bolt Circle Diam.	Number of Holes	Diam. of Bolt Holes	
								Class B	Class D
	D	B	t	T	X	C			
4	228.6	116.1	12.7	22.2	134.9	190.5	8	19.1	19.1
5	254.0	143.8	14.3	31.8	160.3	215.9	8	19.1	22.2
6	279.4	170.7	14.3	31.8	192.1	241.3	8	19.1	22.2
8	342.9	221.5	14.3	31.8	246.1	298.5	8	19.1	22.2
10	406.4	276.4	17.5	31.8	304.8	362.0	12	19.1	25.4
12	482.6	327.2	17.5	31.8	365.1	431.8	12	19.1	25.4
14	533.4	360.4	19.1	31.8	400.1	476.3	12	22.2	28.6
16	596.9	411.2	19.1	31.8	457.2	539.8	16	22.2	28.6
18	635.0	462.0	19.1	31.8	504.8	577.9	16	22.2	31.8
20	698.5	512.8	19.1	31.8	558.8	635.0	20	22.2	31.8
22	749.3	563.6	25.4	44.5	616.0	692.2	20	22.2	34.9
24	812.8	614.4	25.4	44.5	663.6	749.3	20	22.2	34.9
26	870.0	665.2	25.4	44.5	723.9	806.5	24	22.2	34.9
28	927.1	716.0	25.4	44.5	774.7	863.6	28	22.2	34.9
30	984.3	766.8	25.4	44.5	825.5	914.4	28	25.4	34.9
32	1,060.5	817.6	28.6	44.5	882.7	977.9	28	25.4	41.3
34	1,111.3	868.4	28.6	44.5	933.5	1,028.7	32	25.4	41.3
36	1,168.4	919.2	28.6	44.5	984.3	1,085.9	32	25.4	41.3
38	1,238.3	970.0	28.6	44.5	1,035.1	1,149.4	32	25.4	41.3
40	1,289.1	1,020.8	28.6	44.5	1,092.2	1,200.2	36	25.4	41.3
42	1,346.2	1,071.6	31.8	44.5	1,143.0	1,257.3	36	28.6	41.3
44	1,403.4	1,122.4	31.8	57.2	1,193.8	1,314.5	40	28.6	41.3
46	1,454.2	1,173.2	31.8	57.2	1,244.6	1,365.3	40	28.6	41.3
48	1,511.3	1,224.0	34.9	63.5	1,295.4	1,422.4	44	28.6	41.3
50	1,568.5	1,274.8	34.9	63.5	1,346.2	1,479.6	44	31.8	47.6
52	1,625.6	1,325.6	34.9	63.5	1,397.0	1,536.7	44	31.8	47.6
54	1,682.8	1,376.4	34.9	63.5	1,447.8	1,593.9	44	34.9	47.6
60	1,854.2	1,528.8	38.1	69.9	1,600.2	1,759.0	52	34.9	47.6
66	2,032.0	1,681.2	38.1	69.9	1,752.6	1,930.4	52	34.9	47.6
72	2,197.1	1,833.6	38.1	69.9	1,905.0	2,095.5	60	34.9	47.6
78	2,362.2	1,986.0	44.5	76.2	2,063.8	2,260.6	64	41.3	54.0
84	2,533.7	2,138.4	44.5	76.2	2,222.5	2,425.7	64	41.3	54.0
90	2,705.1	2,290.8	50.8	82.6	2,381.3	2,590.8	68	47.6	60.3
96	2,876.6	2,443.2	50.8	82.6	2,540.0	2,755.9	68	47.6	60.3
102	3,048.0	2,595.6	57.2	88.9	2,686.1	2,908.3	72	54.0	66.7
108	3,219.5	2,748.0	57.2	88.9	2,832.1	3,067.1	72	54.0	66.7
114	3,390.9	2,900.4	63.5	95.3	2,990.9	3,219.5	76	60.3	73.0
120	3,562.4	3,052.8	63.5	95.3	3,149.6	3,371.9	76	60.3	73.0

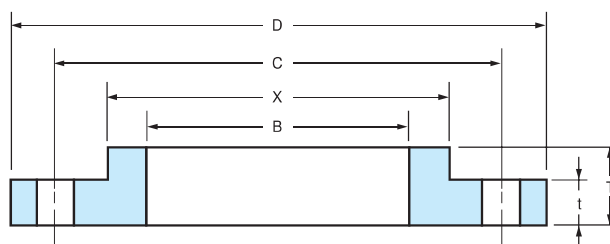
Notes:

- (1) For standard finishes for contact face, refer to page 46.
- (2) For Slip-on Flanges, (Hub Type Flanges), the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.
- (3) The 'Bore (B)' shall be $\frac{3}{16}$ in. larger than the nominal outside diameter of the pipe, unless otherwise specified.



CLASS E FLANGES TABLE 4

AWWA Standard Steel Hub Flanges, Class E (275 psi)



SLIP-ON

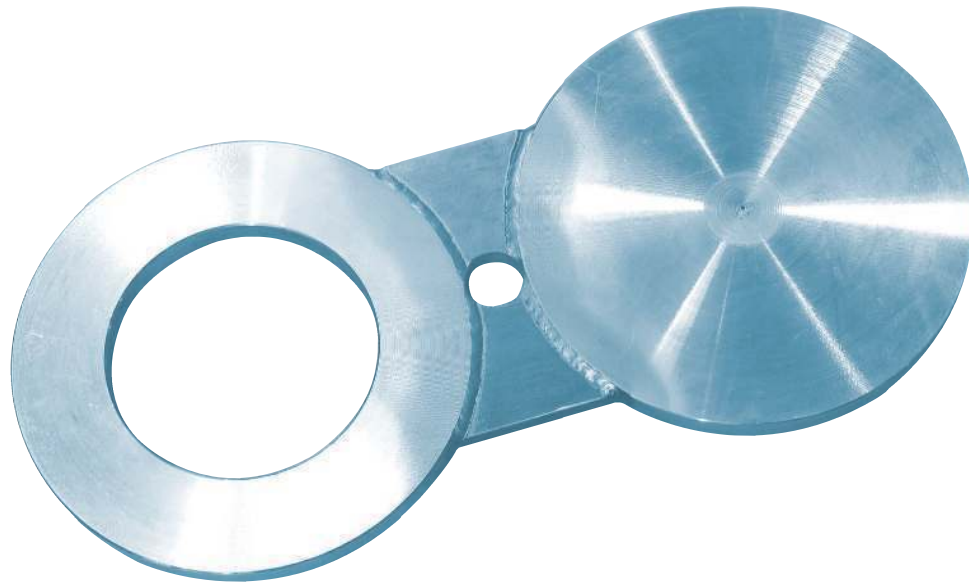
AWWA C207

Unit : mm

Nominal Pipe Size	Outside Diam.	Bore	Thickness	Length Through Hub	Diam. of Hub at Base	DRILLING		
						Bolt Circle Diam.	Number of Holes	Diam. of Bolt Holes
	D	B	t	T	X	C		
4	228.6	116.1	23.8	33.3	134.9	190.5	8	19.1
5	254.0	143.8	23.8	36.5	163.5	215.9	8	22.2
6	279.4	170.7	25.4	39.7	192.1	241.3	8	22.2
8	342.9	221.5	28.6	44.5	246.1	298.5	8	22.2
10	406.4	276.4	30.2	49.2	304.8	362.0	12	25.4
12	482.6	327.2	31.8	55.6	365.1	431.8	12	25.4
14	533.4	360.4	34.9	57.2	400.1	476.3	12	28.6
16	596.9	411.2	36.5	63.5	457.2	539.8	16	28.6
18	635.0	462.0	39.7	68.3	504.8	577.9	16	31.8
20	698.5	512.8	42.9	73.0	558.8	635.0	20	31.8
22	749.3	563.6	46.0	79.4	609.6	692.2	20	34.9
24	812.8	614.4	47.6	82.6	663.6	749.3	20	34.9
26	870.0	665.2	50.8	85.7	723.9	806.5	24	34.9
28	927.1	716.0	52.4	87.3	781.1	863.6	28	34.9
30	984.3	766.8	54.0	88.9	831.9	914.4	28	34.9
32	1,060.5	817.6	57.2	92.1	889.0	977.9	28	41.3
34	1,111.3	868.4	58.7	93.7	939.8	1,028.7	32	41.3
36	1,168.4	919.2	60.3	95.3	997.0	1,085.9	32	41.3
38	1,238.3	970.0	60.3	95.3	1,060.5	1,149.4	32	41.3
40	1,289.1	1,020.8	63.5	98.4	1,111.3	1,200.2	36	41.3
42	1,346.2	1,071.6	66.7	101.6	1,168.4	1,257.3	36	41.3
44	1,403.4	1,122.4	66.7	101.6	1,219.2	1,314.5	40	41.3
46	1,454.2	1,173.2	68.3	103.2	1,270.0	1,365.3	40	41.3
48	1,511.3	1,224.0	69.9	104.8	1,327.2	1,422.4	44	41.3
50	1,568.5	1,274.8	69.9	104.8	1,378.0	1,479.6	44	47.6
52	1,625.6	1,325.6	73.0	108.0	1,435.1	1,536.7	44	47.6
54	1,682.8	1,376.4	76.2	111.1	1,492.3	1,593.9	44	47.6
60	1,854.2	1,528.8	79.4	114.3	1,657.4	1,759.0	52	47.6
66	2,032.0	1,681.2	85.7	123.8	1,816.1	1,930.4	52	47.6
72	2,197.1	1,833.6	88.9	127.0	1,993.9	2,095.5	60	47.6
78	2,362.2	1,986.0	98.4	136.5	2,146.3	2,660.6	64	54.0
84	2,533.7	2,138.4	98.4	136.5	2,298.7	2,425.7	64	54.0
90	2,705.1	2,290.8	108.0	146.1	2,457.5	2,590.8	68	60.3
96	2,876.6	2,443.2	108.0	146.1	2,609.9	2,755.9	68	60.3
102	3,048.0	2,595.6	117.5	155.6	2,762.3	2,908.3	72	66.7
108	3,219.5	2,748.0	117.5	155.6	2,908.3	3,067.1	72	66.7
114	3,390.9	2,900.4	127.0	165.1	3,079.8	3,219.5	76	73.0
120	3,562.4	3,052.8	127.0	165.1	3,251.2	3,371.9	76	73.0

Notes:

- (1) For standard finishes for contact face, refer to page 46.
- (2) For Slip-on Flanges, (Hub Type Flanges), the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.
- (3) The 'Bore' (B) shall be $\frac{3}{16}$ in. larger than the nominal outside diameter of the pipe, unless otherwise specified.



ANSI/ASME B16.48

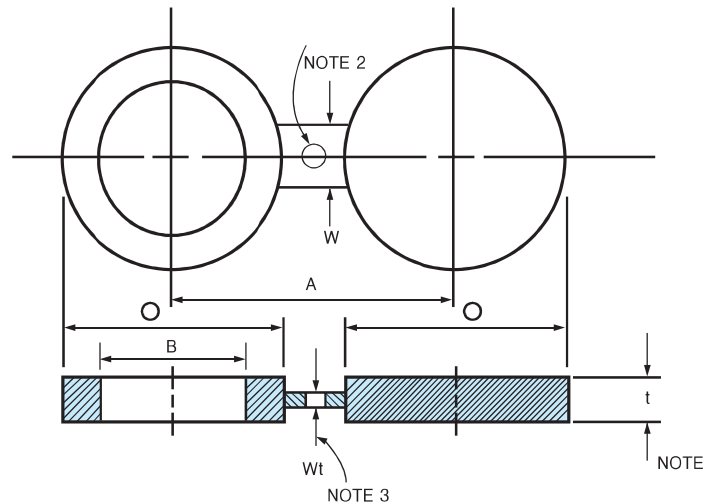
STEEL LINE BLANKS

(API STANDARD 590)

- Class 150, 300 Figure 8 Blanks
- Class 600, 900 Figure 8 Blanks
- Class 1500, 2500 Figure 8 Blanks
- Class 150 Spacer and Blanks
- Class 300 Spacer and Blanks



CLASS 150, 300 FIGURE 8 BLANKS



Unit : mm

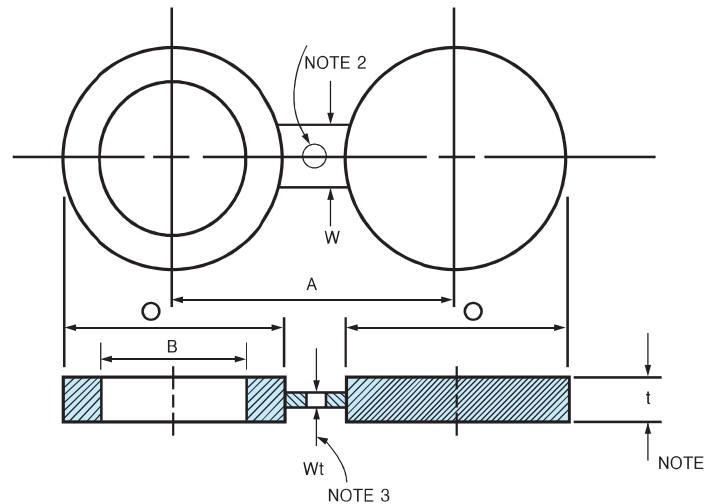
SIZE	150 LB					300 LB				
	B	O	A	t	W	B	O	A	t	W
1/2	16	44	60	3	38	16	51	67	6	38
3/4	21	54	70	3	38	21	64	83	6	38
1	27	64	79	3	38	27	70	89	6	38
1 1/4	42	73	89	6	38	42	79	99	6	38
1 1/2	48	83	99	6	38	48	92	114	6	51
2	60	102	121	6	51	60	108	127	10	51
2 1/2	73	121	140	6	51	73	127	149	10	64
3	89	133	152	6	64	89	146	168	10	64
3 1/2	102	159	178	10	64	102	162	184	13	64
4	114	171	190	10	64	114	178	200	13	64
5	141	194	216	10	76	141	213	235	16	76
6	168	219	241	13	76	168	248	270	16	76
8	219	276	298	13	76	219	305	330	22	89
10	273	337	362	16	102	273	359	387	25	102
12	324	406	432	19	102	324	419	451	28	102
14	356	448	476	19	108	356	483	514	32	121
16	406	511	540	22	108	406	537	572	38	124
18	457	546	578	25	114	457	594	629	41	114
20	508	603	635	28	121	508	651	686	44	121
24	610	714	749	32	140	610	772	813	51	140

Notes:

- (1) Thickness (dimension t) includes a corrosion allowance of 0.05 inch (1.3 millimeters) for material groups 1.1, 1.7, 1.9, 1.10, and 1.12. Corrosion allowance is 0.00 inch for material groups 2.1, 2.2, 2.4, and 2.5.
- (2) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole.
- (3) The thickness of the web (or tie bar) dimension Wt , shall be 0.25 inch (6.35 millimeter) minimum, except when t is less than 0.25 inch, Wt shall equal t .



CLASS 600, 900 FIGURE 8 BLANKS



Unit : mm

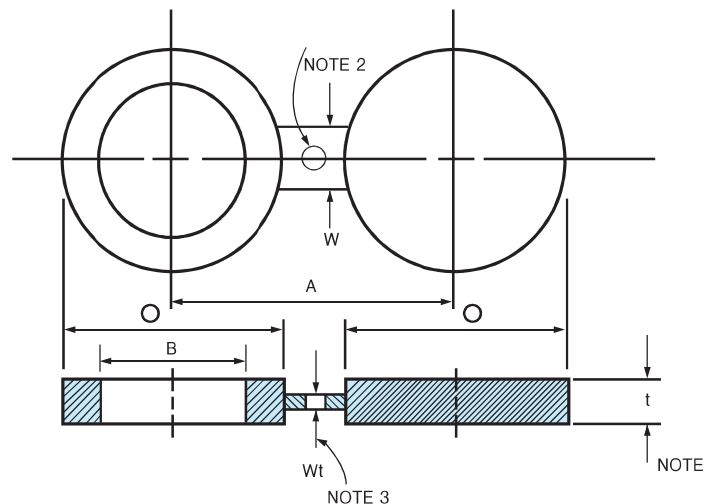
SIZE	600 LB					900 LB				
	B	O	A	t	W	B	O	A	t	W
1/2	16	51	67	6	38	16	60	83	6	38
3/4	21	64	83	6	38	21	67	89	6	41
1	27	70	89	6	57	27	76	102	6	57
1 1/4	37	79	99	10	57	37	86	111	10	57
1 1/2	43	92	114	10	67	43	95	124	10	67
2	55	108	127	10	57	55	140	165	13	57
2 1/2	67	127	149	13	67	67	162	190	13	67
3	83	146	168	13	67	83	165	190	16	67
3 1/2	96	159	184	16	76	—	—	—	—	—
4	108	191	216	16	76	108	203	235	19	76
5	135	238	267	19	86	135	244	279	22	86
6	162	264	292	22	86	162	286	318	25	86
8	212	318	349	28	95	212	356	394	35	95
10	265	397	432	35	105	265	432	470	41	105
12	315	454	489	41	105	315	495	533	48	105
14	346	489	527	44	114	346	518	559	54	114
16	397	562	603	51	124	397	572	616	60	124
18	448	610	654	54	133	448	635	686	67	133
20	497	679	724	64	133	497	695	749	73	133
24	597	787	838	73	152	597	835	902	89	152

Notes:

- (1) Thickness (dimension t) includes a corrosion allowance of 0.05 inch (1.3 millimeters) for material groups 1.1, 1.7, 1.9, 1.10, and 1.12. Corrosion allowance is 0.00 inch for material groups 2.1, 2.2, 2.4, and 2.5.
- (2) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole.
- (3) The thickness of the web (or tie bar) dimension Wt , shall be 0.25 inch (6.35 millimeter) minimum, except when t is less than 0.25 inch, Wt shall equal t .



CLASS 1500, 2500 FIGURE 8 BLANKS



Unit : mm

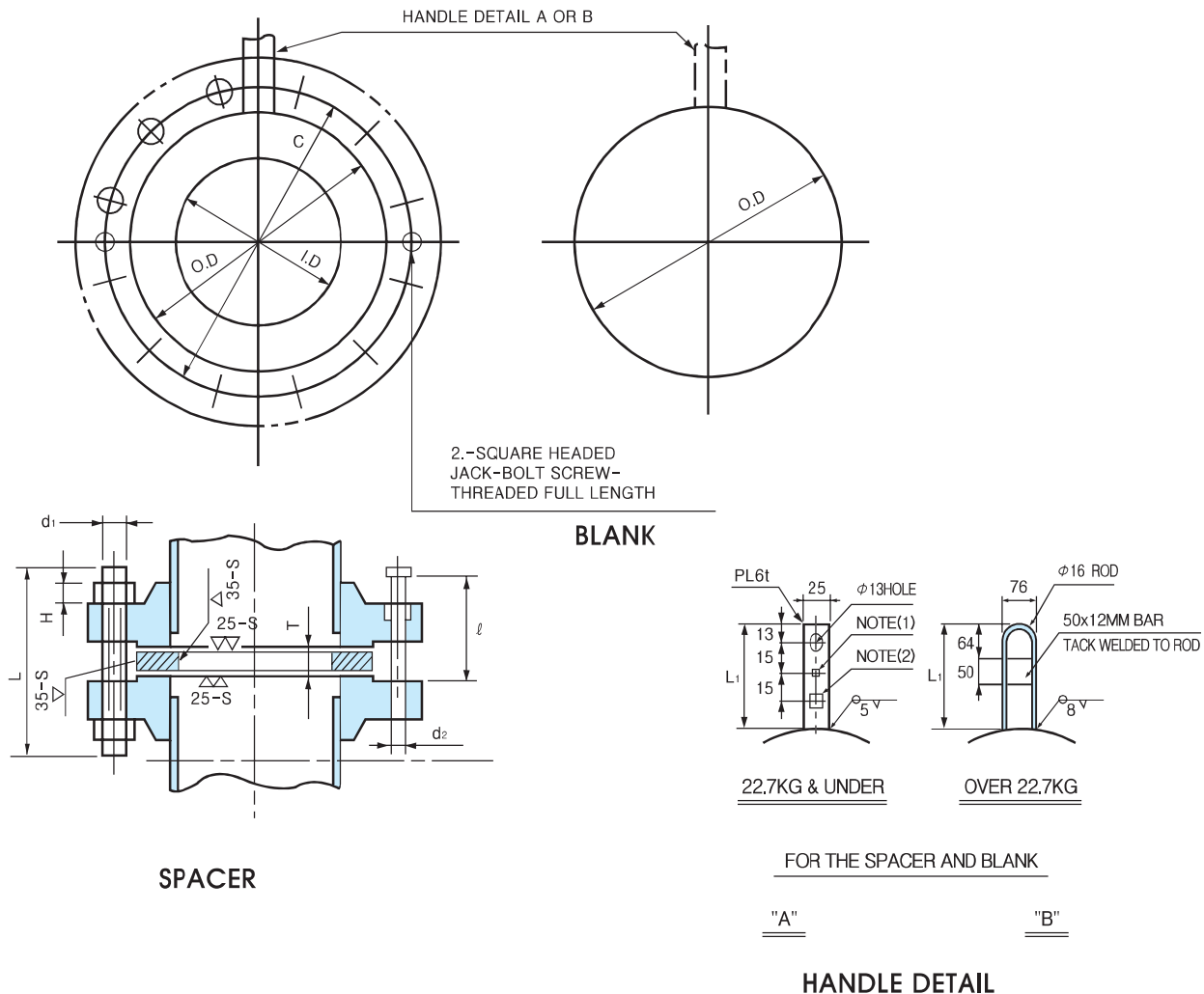
SIZE	1500 LB					2500 LB				
	B	O	A	t	W	B	O	A	t	W
1/2	16	60	83	6	38	16	67	89	10	38
3/4	21	67	89	10	41	21	73	95	10	41
1	27	76	102	10	64	27	83	108	10	64
1 1/4	35	86	111	10	64	35	102	130	13	64
1 1/2	41	95	124	13	70	41	114	146	16	70
2	53	140	165	13	70	53	143	171	16	70
2 1/2	63	162	190	16	76	63	165	197	19	76
3	78	171	203	19	76	78	194	229	22	76
3 1/2	—	—	—	—	—	—	—	—	—	—
4	102	206	241	22	89	102	232	273	28	89
5	128	251	292	28	89	128	276	324	35	89
6	154	279	318	35	89	154	314	368	41	89
8	203	349	394	41	102	198	384	438	54	102
10	255	432	483	51	114	248	473	540	67	114
12	303	518	572	60	114	289	546	619	79	114
14	333	575	635	67	127	—	—	—	—	—
16	381	638	705	76	133	—	—	—	—	—
18	429	702	775	86	146	—	—	—	—	—
20	478	752	832	95	152	—	—	—	—	—
24	575	899	991	111	178	—	—	—	—	—

Notes:

- (1) Thickness (dimension t) includes a corrosion allowance of 0.05 inch (1.3 millimeters) for material groups 1.1, 1.7, 1.9, 1.10, and 1.12. Corrosion allowance is 0.00 inch for material groups 2.1, 2.2, 2.4, and 2.5.
- (2) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole.
- (3) The thickness of the web (or tie bar) dimension Wt , shall be 0.25 inch (6.35 millimeter) minimum, except when t is less than 0.25 inch, Wt shall equal t .



CLASS 150 SPACER AND BLANKS



Unit : mm

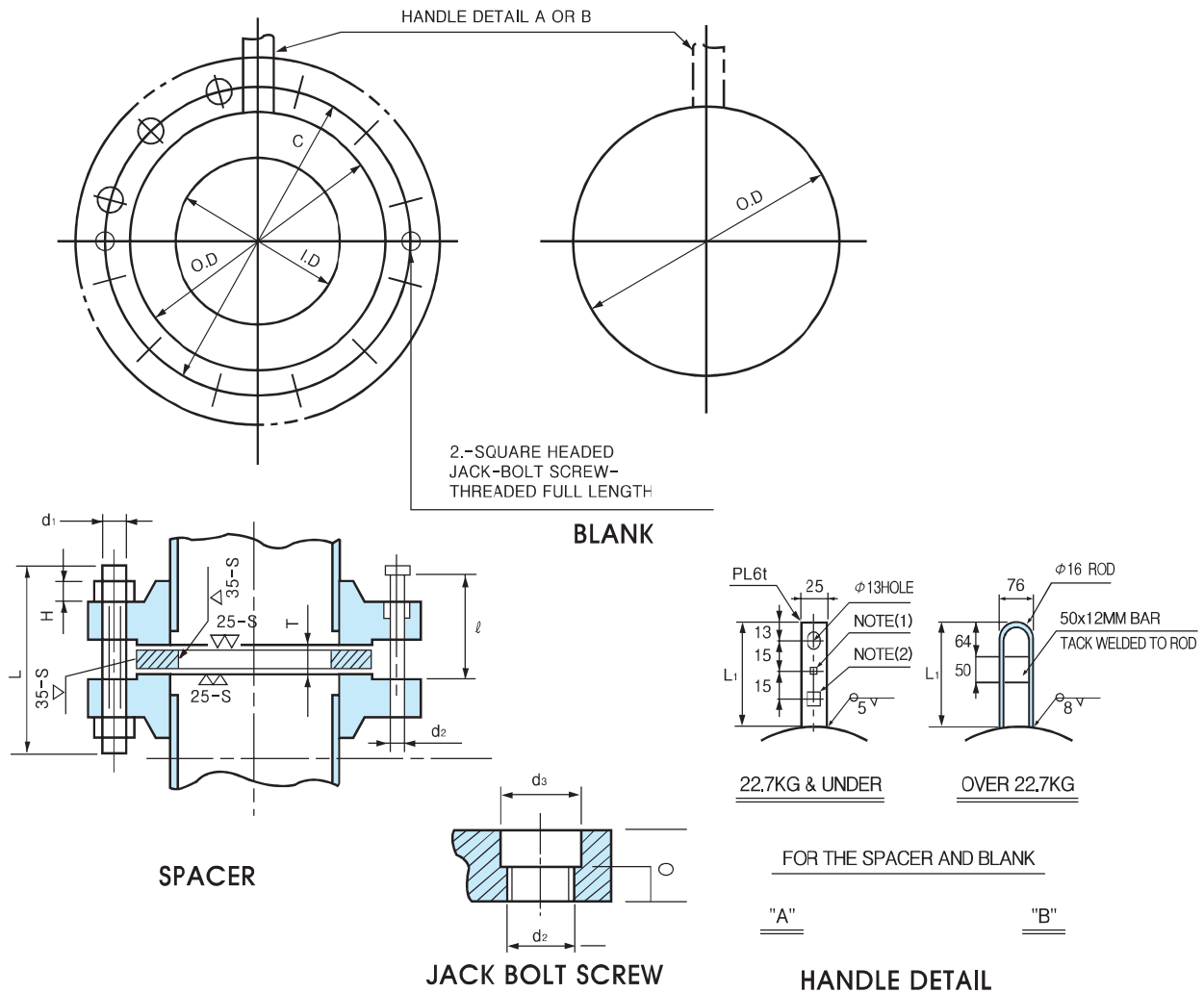
SIZE	SPACER & BLANK				BOLT & NUT					JACK SCREW		WEIGHT (KG)		REMARKS
	O.D	I.D	T	L1	C	d1	NO	L	H	d2	†	SPACER	BLANK	
8	276	219	13	165	298.4	M20	8	140	20	M20	75	3.6	7.8	
10	337	273	16	165	361.9	M22	12	150	22	M20	80	5.8	13.5	
12	406	324	19	165	431.8	M22	12	155	22	M20	85	9.9	22.7	
14	448	359	19	172	476.2	M27	12	175	27	M20	90	12.4	30.6	
16	511	406	22	172	539.7	M27	16	180	27	M22	90	17.0	42.8	
18	546	457	25	172	577.8	M30	16	195	30	M22	100	17.9	54.2	
20	603	508	28	178	635.0	M30	20	210	30	M22	105	24.2	73.0	
24	714	610	32	178	749.3	M33	20	230	30	M24	115	36.7	121.0	

Notes:

- (1) 5 φ Hole shall only be applied to the spacer.
- (2) To be die stamp on both side as follows, spacer is "S" and blank in "B"
- (3) For dimensional tolerances



CLASS 300 SPACER AND BLANKS



Unit : mm

SIZE	SPACER & BLANK				BOLT & NUT					JACK SCREW		WEIGHT (KG)	
	O.D	I.D	T	L1	C	d1	NO	L	H	d2	t	SPACER	BLANK
8	305	219	22	165	330.2	M22	12	175	22	M20	95	7.9	14.0
10	359	273	25	172	387.3	M27	16	205	27	M20	105	11.2	22.5
12	419	324	28	178	450.8	M30	16	225	30	M20	115	17.3	37.7
14	483	356	32	178	514.3	M30	20	235	30	M22	120	27.1	54.2
16	537	406	38	184	571.5	M33	20	250	33	M22	130	34.2	73.9
18	594	457	41	191	628.6	M33	24	260	33	M22	135	44.5	101.2
20	651	508	44	191	685.8	M33	24	275	33	M24	145	56.7	134.6
24	772	610	51	203	812.8	M39	24	310	39	M24	160	89.1	222.2

Notes:

- (1) 5 ϕ Hole shall only be applied to the spacer.
- (2) To be die stamp on both side as follows, spacer is "S" and blank in "B"
- (3) For dimensional tolerances

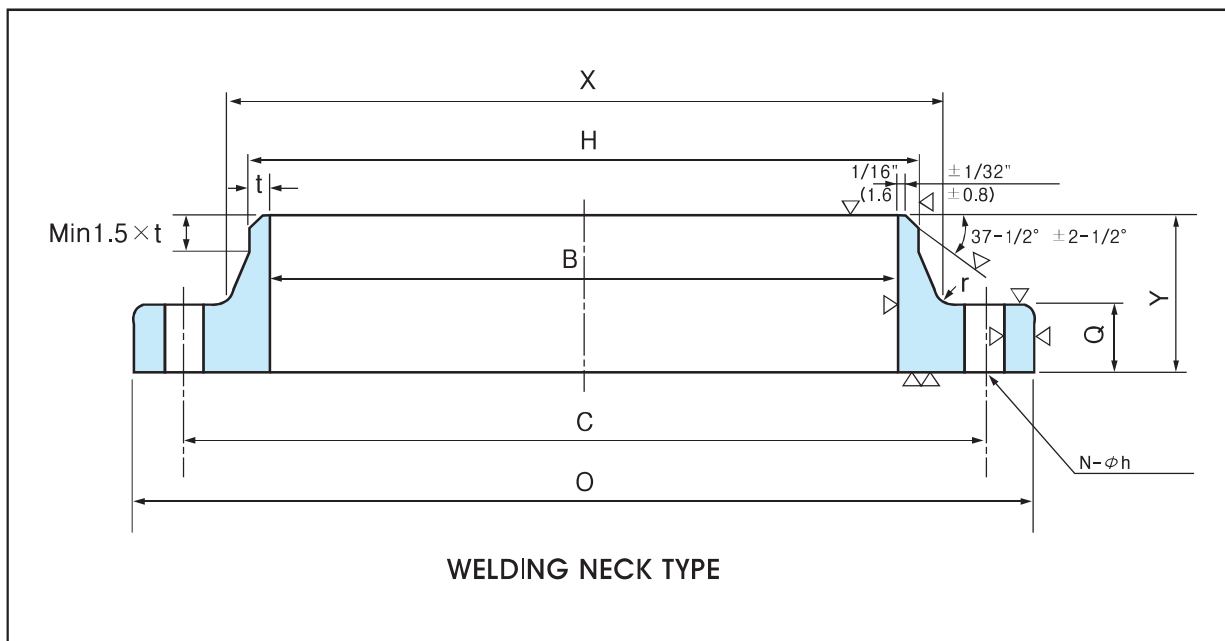


TAYLOR FLANGES

- Class 125 Flanges
- Class 175 Flanges
- Class 250 Flanges
- Class 350 Flanges



TAYLOR FLANGES CLASS-125



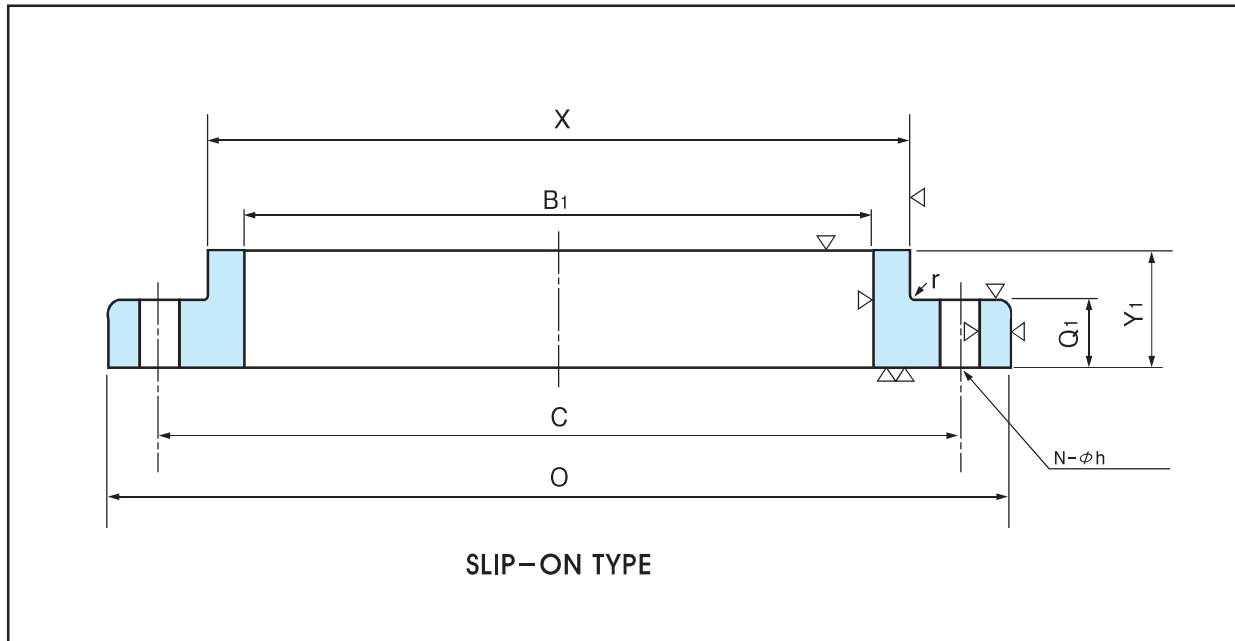
Nominal Pipe Size	COMMON DIMENSIONS						THICKNESS				LENGTH THRU HUB			
	Outside Diameter of Flange		Diameter at Base of Hub		Diameter of Hub at Bevel		Welding Neck		Slip-On		Welding Neck		Slip-On	
	O		X		H		Q		Q1		Y		Y1	
	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.
26	870.0	34-1/4	723.9	28-1/2	660.4	26	50.8	2	50.8	2	127.0	5	85.7	3-3/8
28	927.1	36-1/2	781.1	30-3/4	711.2	28	52.4	2-1/16	52.4	2-1/16	128.6	5-1/16	87.3	3-7/16
30	984.3	38-3/4	831.9	32-3/4	762.0	30	54.0	2-1/8	54.0	2-1/8	130.2	5-1/8	88.9	3-1/2
32	1060.5	41-3/4	889.0	35	812.8	32	57.2	2-1/4	57.2	2-1/4	133.4	5-1/4	92.1	3-5/8
34	1111.3	43-3/4	939.8	37	863.6	34	58.8	2-5/16	58.8	2-5/16	134.9	5-5/16	93.7	3-11/16
36	1168.4	46	997.0	39-1/4	914.4	36	60.3	2-3/8	60.3	2-3/8	136.5	5-3/8	95.3	3-3/4
38	1238.3	48-3/4	1060.5	41-3/4	965.2	38	60.3	2-3/8	60.3	2-3/8	136.5	5-3/8	95.3	3-3/4
40	1289.1	50-3/4	1111.3	43-3/4	1016.0	40	63.5	2-1/2	63.5	2-1/2	139.7	5-1/2	98.4	3-7/8
42	1346.2	53	1168.4	46	1066.8	42	66.7	2-5/8	66.7	2-5/8	142.9	5-5/8	101.6	4
44	1403.4	55-1/4	1219.2	48	1117.6	44	66.7	2-5/8	66.7	2-5/8	142.9	5-5/8	101.6	4
46	1454.2	57-1/4	1270.0	50	1168.4	46	68.3	2-11/16	68.3	2-11/16	144.5	5-11/16	103.2	4-1/16
48	1511.3	59-1/2	1327.2	52-1/4	1219.2	48	69.9	2-3/4	69.9	2-3/4	146.1	5-3/4	104.8	4-1/8
50	1568.5	61-3/4	1378.0	54-1/4	1270.0	50	69.9	2-3/4	69.9	2-3/4	146.1	5-3/4	104.8	4-1/8
52	1625.6	64	1435.1	56-1/2	1320.8	52	73.0	2-7/8	73.0	2-7/8	149.2	5-7/8	108.0	4-1/4
54	1682.8	66-1/4	1492.3	58-3/4	1371.6	54	76.2	3	76.2	3	152.4	6	111.1	4-3/8
60	1854.2	73	1657.4	65-1/4	1524.0	60	79.4	3-1/8	79.4	3-1/8	155.6	6-1/8	114.3	4-1/2
66	2032.0	80	1816.1	71-1/2	1676.4	66	85.7	3-3/8	85.7	3-3/8	161.9	6-3/8	123.8	4-7/8
72	2197.1	86-1/2	1993.9	78-1/2	1828.8	72	88.9	3-1/2	88.9	3-1/2	165.1	6-1/2	127.0	5
84	2533.7	99-3/4	2298.7	90-1/2	2133.6	84	98.4	3-7/8	98.4	3-7/8	174.6	6-7/8	136.5	5-3/8
96	2876.6	113-1/4	2609.9	102-3/4	2438.4	96	108.0	4-1/4	108.0	4-1/4	184.2	7-1/4	146.1	5-3/4

Notes:

Properly there is no Steel Flange Standard of this designation, the term "CLASS 125" being precisely applicable to a Cast Iron Standard under ANSI B16.1.

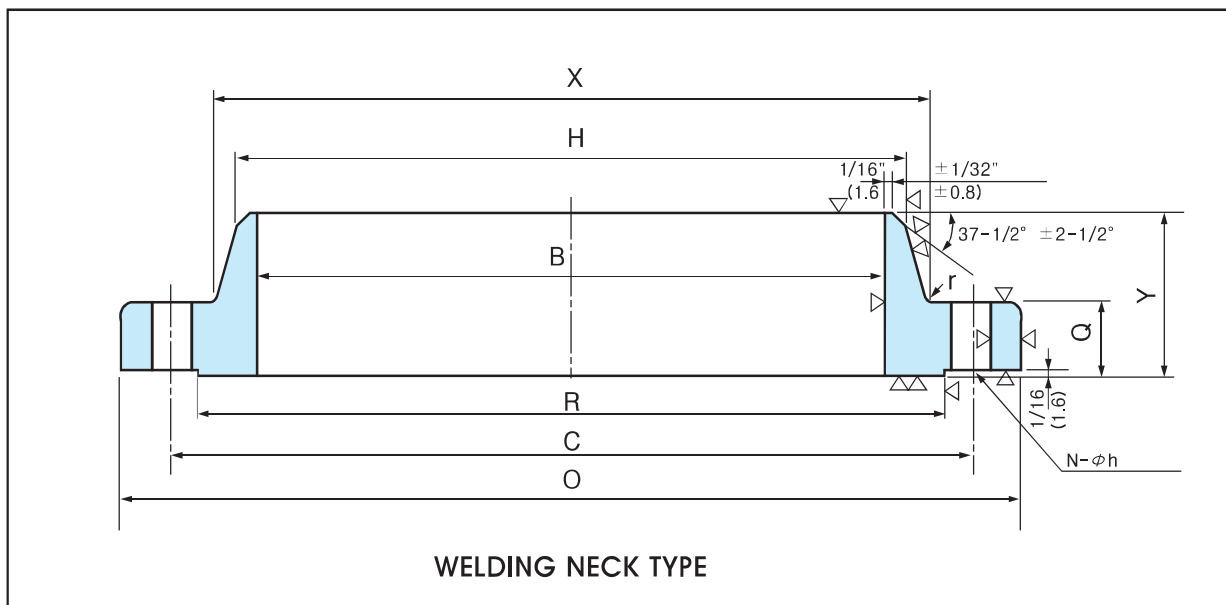
These flanges are used for connections to cast steel valves, pumps or other equipment, having flanged ends made to Cast Iron Standard dimensions.

These flanges are identical with Class E of AWWA C207 For machining tolerances see ANSI B16.5.



Nominal Pipe Size	INSIDE DIAMETER		DRILLING TEMPLATE				Fillet Radius		APPROX WEIGHT	
	Welding Neck	Slip-On	Bolt Circle Diameter		Number Of Holes	Diam, of Holes			Welding Neck	Slip-On
	B	B ₁	C		N	h	r		Kg	Kg
		mm. in.	mm. in.				mm. in.			
26	To be specified by purchaser	666.8	26-1/4	806.5	31-3/4	24	1-3/8	9.5 3/8	118	107
28		717.6	28-1/4	863.6	34	28	1-3/8	9.5 3/8	134	122
30		768.4	30-1/4	914.4	36	28	1-3/8	9.5 3/8	154	138
32		819.2	32-1/4	977.9	38-1/2	28	1-5/8	9.5 3/8	186	170
34		870.0	34-1/4	1028.7	40-1/2	32	1-5/8	9.5 3/8	200	181
36		920.8	36-1/4	1085.9	42-3/4	32	1-5/8	9.5 3/8	225	204
38		971.6	38-1/4	1149.4	45-1/4	32	1-5/8	9.5 3/8	259	240
40		1022.4	40-1/4	1200.2	47-1/4	36	1-5/8	9.5 3/8	281	259
42		1073.2	42-1/4	1257.3	49-1/2	36	1-5/8	9.5 3/8	322	295
44		1124.0	44-1/4	1314.5	51-3/4	40	1-5/8	9.5 3/8	340	313
46		1174.8	46-1/4	1365.3	53-3/4	40	1-5/8	9.5 3/8	363	331
48		1225.6	48-1/4	1422.4	56	44	1-5/8	9.5 3/8	395	363
50		1276.4	50-1/4	1479.6	58-1/4	44	1-7/8	11.1 7/16	408	376
52		1327.2	52-1/4	1536.7	60-1/2	44	1-7/8	11.1 7/16	454	417
54		1378.0	54-1/4	1593.9	62-3/4	44	1-7/8	11.1 7/16	499	465
60		1530.4	60-1/4	1759.0	69-1/4	52	1-7/8	11.1 7/16	612	567
66		1682.8	66-1/4	1930.4	76	52	1-7/8	11.1 7/16	805	737
72		1835.2	72-1/4	2095.5	82-1/2	60	1-7/8	11.1 7/16	953	873
84		2140.0	84-1/4	2425.7	95-1/2	64	2-1/8	15.9 5/8	1281	1179
96		2444.8	96-1/4	2755.9	108-1/2	68	2-3/8	22.2 7/8	1724	1486

TAYLOR FLANGES CLASS-175

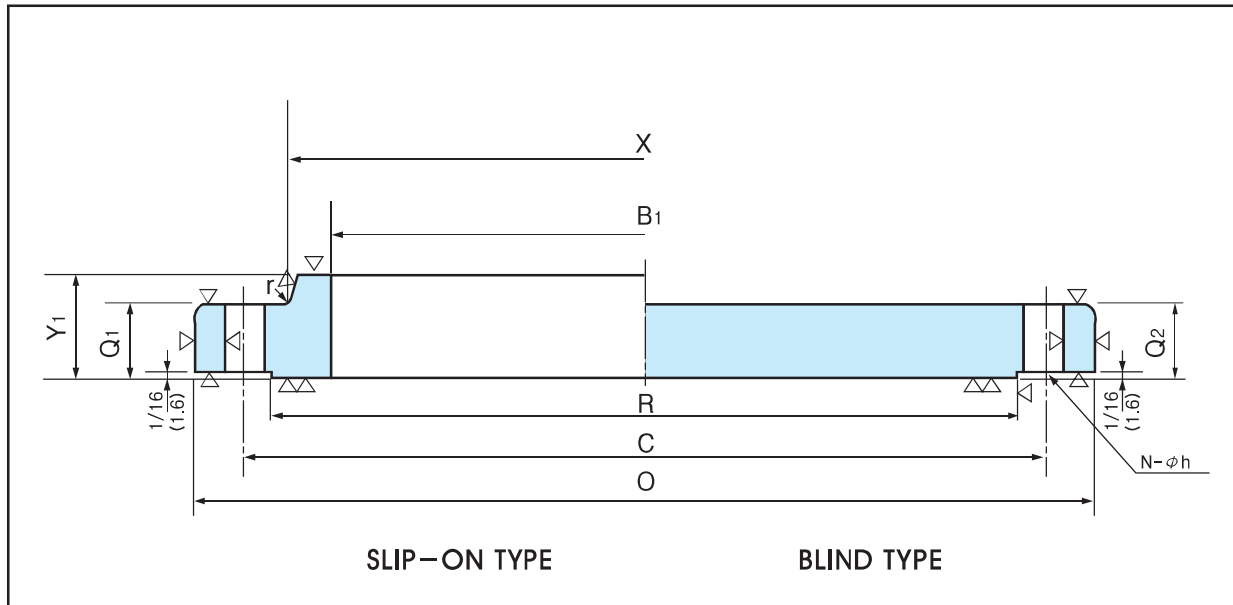


Welding Neck, Slip-on and Blind

Nominal Pipe Size	COMMON DIMENSIONS						THICKNESS						LENGHT THRU HUB			
	Outside Diameter of Flange		O.D Raised Face		Diameter at Base of Hub		Welding Neck		Slip-On		Blind		Welding Neck		Slip-On	
	O		R		X		Q		Q1		Q2		Y		Y1	
	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.
26	800.1	31-1/2	736.6	29	701.7	27-5/8	34.9	1-3/8	34.9	1-3/8	47.6	1-7/8	85.7	3-3/8	69.9	2-3/4
28	850.9	33-1/2	787.4	31	752.5	29-5/8	34.9	1-3/8	34.9	1-3/8	50.8	2	85.7	3-3/8	69.9	2-3/4
30	908.1	35-3/4	844.6	33-1/4	809.6	31-7/8	34.9	1-3/8	34.9	1-3/8	54.0	2-1/8	92.1	3-5/8	69.9	2-3/4
32	958.9	37-3/4	895.4	35-1/4	860.4	33-7/8	34.9	1-3/8	34.9	1-3/8	57.2	2-1/4	92.1	3-5/8	69.9	2-3/4
34	1022.4	40-1/4	949.3	37-3/8	911.2	35-7/8	38.1	1-1/2	44.5	1-3/4	60.3	2-3/8	95.3	3-3/4	85.7	3-3/8
36	1073.2	42-1/4	1000.1	39-3/8	962.0	37-7/8	38.1	1-1/2	44.5	1-3/4	63.5	2-1/2	95.3	3-3/4	85.7	3-3/8
38	1124.0	44-1/4	1050.9	41-3/8	1012.8	39-7/8	44.5	1-3/4	50.8	2	66.7	2-5/8	104.8	4-1/8	95.3	3-3/4
40	1174.8	46-1/4	1101.7	43-3/8	1063.6	41-7/8	44.5	1-3/4	50.8	2	69.9	2-3/4	104.8	4-1/8	101.6	4
42	1244.6	49	1162.1	45-3/4	1120.8	44-1/8	50.8	2	60.3	2-3/8	73.0	2-7/8	114.3	4-1/2	111.1	4-3/8
44	1295.4	51	1212.9	47-3/4	1171.6	46-1/8	50.8	2	60.3	2-3/8	76.2	3	114.3	4-1/2	111.1	4-3/8
46	1346.2	53	1263.7	49-3/4	1222.4	48-1/8	50.8	2	60.3	2-3/8	79.4	3-1/8	114.3	4-1/2	117.5	4-5/8
48	1397.0	55	1314.5	51-3/4	1273.2	50-1/8	57.2	2-1/4	66.7	2-5/8	85.7	3-3/8	123.8	4-7/8	123.8	4-7/8
50	1447.8	57	1365.3	53-3/4	1324.0	52-1/8	57.2	2-1/4	66.7	2-5/8	85.7	3-3/8	123.8	4-7/8	123.8	4-7/8
52	1511.3	59-1/2	1422.4	56	1378.0	54-1/4	66.7	2-5/8	76.2	3	92.1	3-5/8	136.5	5-3/8	136.5	5-3/8
54	1562.1	61-1/2	1473.2	58	1428.8	56-1/4	66.7	2-5/8	76.2	3	92.1	3-5/8	136.5	5-3/8	136.5	5-3/8
60	1714.5	67-1/2	1625.6	64	1581.2	62-1/4	69.9	2-3/4	79.4	3-1/8	101.6	4	146.1	5-3/4	149.2	5-7/8
66	1866.9	73-1/2	1778.0	70	1739.9	68-1/2	79.4	3-1/8	101.6	4	111.1	4-3/8	155.6	6-1/8	174.6	6-7/8
72	2032.0	80	1943.1	76-1/2	1892.3	74-1/2	92.1	3-5/8	127.0	5	120.7	4-3/4	168.3	6-5/8	203.2	8
84	2387.6	94	2289.2	90-1/8	2235.2	88	76.2	3	127.0	5	139.7	5-1/2	177.8	7	215.9	8-1/2
96	2692.4	106	2594.0	102-1/8	2540.0	100	88.9	3-1/2	127.0	5	155.6	6-1/8	190.5	7-1/2	228.6	9

Notes:

- (1) This designation applies to flanges formerly listed as "150lb at 750°F."
- (2) Pressure rating:-175psi at -20°F to 650°F; or 150psi at 750°F.
- (3) When applied to Welding Neck flanges, these ratings are based on inside diameters of pipe or shell as listed in "Nominal Size" column, and pipe or shell thicknesses ranging from 3/8" to 5/8".
- (4) When applied to Slip-on flanges, ratings are based on outside diameters of pipe or shell as listed in "Nominal Size"



Diameter of Hub at Bevel		INSIDE DIAMETER			DRILLING TEMPLATE				Fillet Radius		APPROX WEIGHT			Nominal Pipe Size
		Welding Neck	Slip-On	Bolt Circle Diameter	Number Of Holes	Diam. of Holes	Weld-ing Neck	Slip-On			Blind			
									H			B	B ₁	
mm.	in.		mm.	in.	mm.	in.			mm.	in.	Kg	Kg	Kg	
660.4	26	To be specified by purchaser	666.8	26-1/4	758.8	29-7/8	28	7/8	9.5	3/8	54	48	184	26
711.2	28		717.6	28-1/4	809.6	31-7/8	28	7/8	9.5	3/8	59	52	222	28
762.0	30		768.4	30-1/4	866.8	34-1/8	36	7/8	9.5	3/8	68	59	268	30
812.8	32		819.2	32-1/4	917.6	36-1/8	36	7/8	9.5	3/8	73	64	318	32
863.6	34		870.0	34-1/4	974.7	38-3/8	36	1	9.5	3/8	88	91	381	34
914.4	36		920.8	36-1/4	1025.5	40-3/8	36	1	9.5	3/8	93	95	440	36
965.2	38		971.6	38-1/4	1076.3	42-3/8	36	1	9.5	3/8	111	113	510	38
1016.0	40		1022.6	40-1/4	1127.1	44-3/8	40	1	9.5	3/8	116	122	590	40
1066.8	42		1073.2	42-1/4	1190.6	46-7/8	40	1-1/8	9.5	3/8	154	166	680	42
1117.6	44		1124.0	44-1/4	1241.4	48-7/8	40	1-1/8	9.5	3/8	163	172	771	44
1168.4	46		1174.8	46-1/4	1292.2	50-7/8	40	1-1/8	9.5	3/8	170	186	873	46
1219.2	48		1225.6	48-1/4	1343.0	52-7/8	44	1-1/8	9.5	3/8	195	209	1009	48
1270.0	50		1276.4	50-1/4	1393.8	54-7/8	44	1-1/8	9.5	3/8	204	218	1089	50
1320.8	52		1327.2	52-1/4	1454.2	57-1/4	44	1-1/4	9.5	3/8	254	272	1270	52
1371.6	54		1378.0	54-1/4	1505.0	59-1/4	44	1-1/4	9.5	3/8	263	281	1360	54
1454.0	60		1530.4	60-1/4	1657.4	65-1/4	48	1-1/4	9.5	3/8	308	331	1814	60
1676.4	66		1682.8	66-1/4	1809.8	71-1/4	56	1-1/4	6.4	1/4	376	454	2347	66
1828.8	72		1835.2	72-1/4	1974.9	77-3/4	64	1-1/4	12.7	1/2	488	635	3016	72
2133.6	84		2140.0	84-1/4	2324.1	91-1/2	72	1-3/8	12.7	1/2	703	1021	-	84
2438.4	96		2444.8	96-1/4	2628.9	103-1/2	88	1-3/8	12.7	1/2	885	1179	-	96

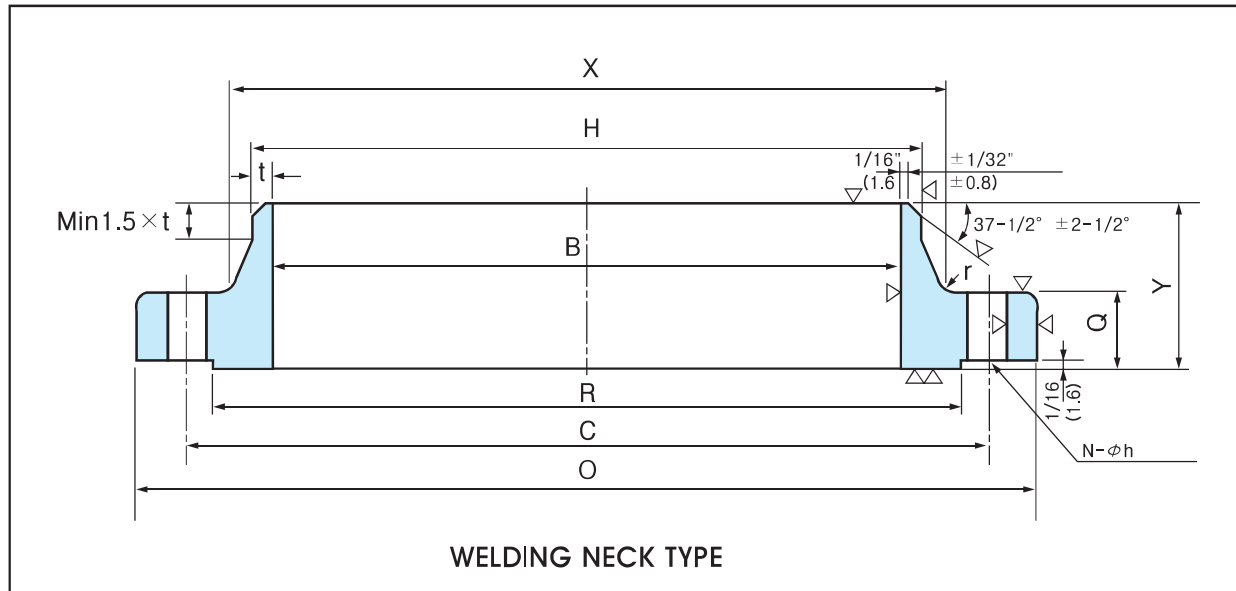
column. Bored slip to over nominal O.D pipe, any larger bore will affect the pressure rating.

- (5) These flanges have been designed in accordance with "Modern Flange Design" (Taylor Forge Bulletin 722) and hence they comply in all respects with the current ASME Code.
- (6) For machining tolerances see ANSI Standard B16.5.



TAYLOR FLANGES CLASS-250

(ANSI-B16.b)



Welding Neck and Slip-on

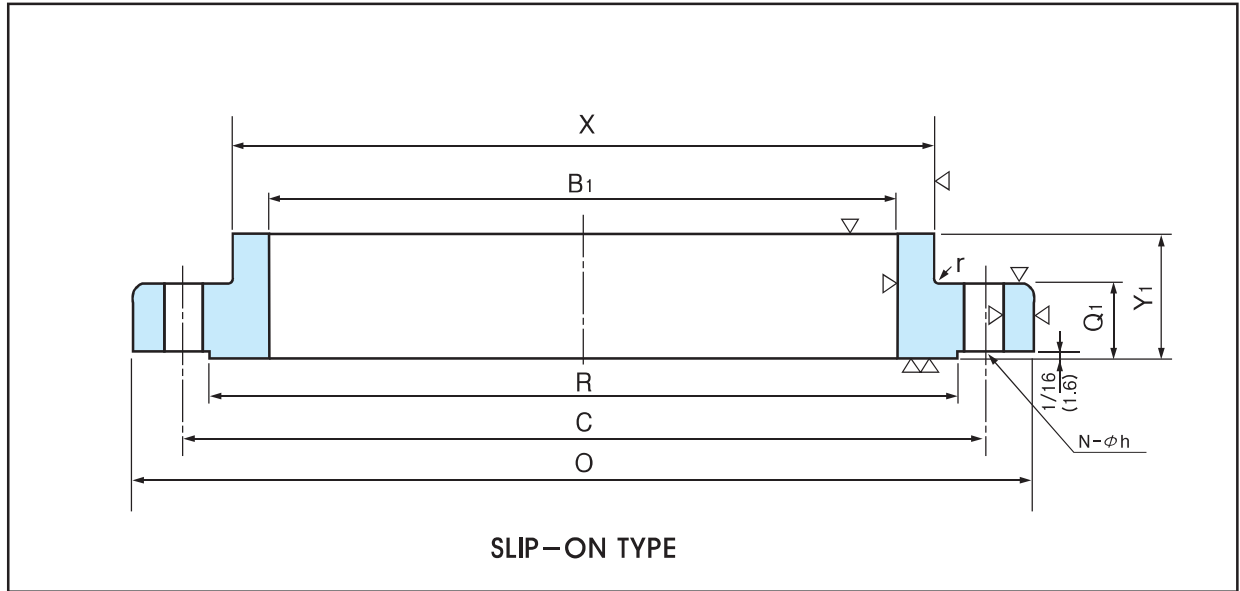
Nominal Pipe Size	COMMON DIMENSIONS						THICKNESS				LENGHT THRU HUB			
	Outside Diameter of Flange		O.D Raised Face		Diameter of Hub		Welding Neck		Slip-On		Welding Neck		Slip-On	
	O		R		X		Q		Q1		Y		Y1	
	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.
26	971.6	38-1/4	823.9	32-7/16	774.7	30-1/2	71.5	2-13/16	71.5	2-13/16	147.7	5-13/16	120.7	4-3/4
28	1035.1	40-3/4	887.4	34-15/16	838.2	33	74.6	2-15/16	74.6	2-15/16	150.8	5-15/16	127.0	5
30	1092.2	43	944.6	37-3/16	895.4	35-1/4	76.2	3	76.2	3	152.4	6	127.0	5
32	1149.4	45-1/4	1001.7	39-7/16	952.5	37-1/2	79.4	3-1/8	79.4	3-1/8	155.6	6-1/8	130.2	5-1/8
34	1206.5	47-1/2	1052.5	41-7/16	1003.3	39-1/2	82.6	3-1/4	82.6	3-1/4	158.8	6-1/4	133.4	5-1/4
36	1270.0	50	1109.7	43-11/16	1054.1	41-1/2	85.7	3-3/8	85.7	3-3/8	161.9	6-3/8	136.5	5-3/8
38	1327.2	52-1/4	1160.5	45-11/16	1104.9	43-1/2	87.3	3-7/16	87.3	3-7/16	163.5	6-7/16	139.7	5-1/2
40	1384.3	54-1/2	1217.6	47-15/16	1162.1	45-3/4	90.5	3-9/16	90.5	3-9/16	166.7	6-9/16	139.7	5-1/2
42	1447.8	57	1281.1	50-7/16	1212.9	47-3/4	93.7	3-11/16	93.7	3-11/16	176.2	6-15/16	142.9	5-5/8
44	1505.0	59-1/4	1338.3	52-11/16	1263.7	49-3/4	95.3	3-3/4	95.3	3-3/4	177.8	7	146.1	5-3/4
46	1562.1	61-1/2	1395.4	54-15/16	1314.5	51-3/4	98.4	3-7/8	98.4	3-7/8	181.0	7-1/8	149.2	5-7/8
48	1651.0	65	1484.3	58-7/16	1371.6	54	101.6	4	101.6	4	184.2	7-1/4	152.4	6

Notes:

Properly there is no Steel Flange Standard of this designation, the term "Class 250" being pecisely applicable to a Cast Iron Iron Standard under ANSI B16b.

They are ordinarily used for flanged connections to cast steel valves and equipment made to Class 250 Cast Iron Standard dimensions and we recommend their use only for such purposes.

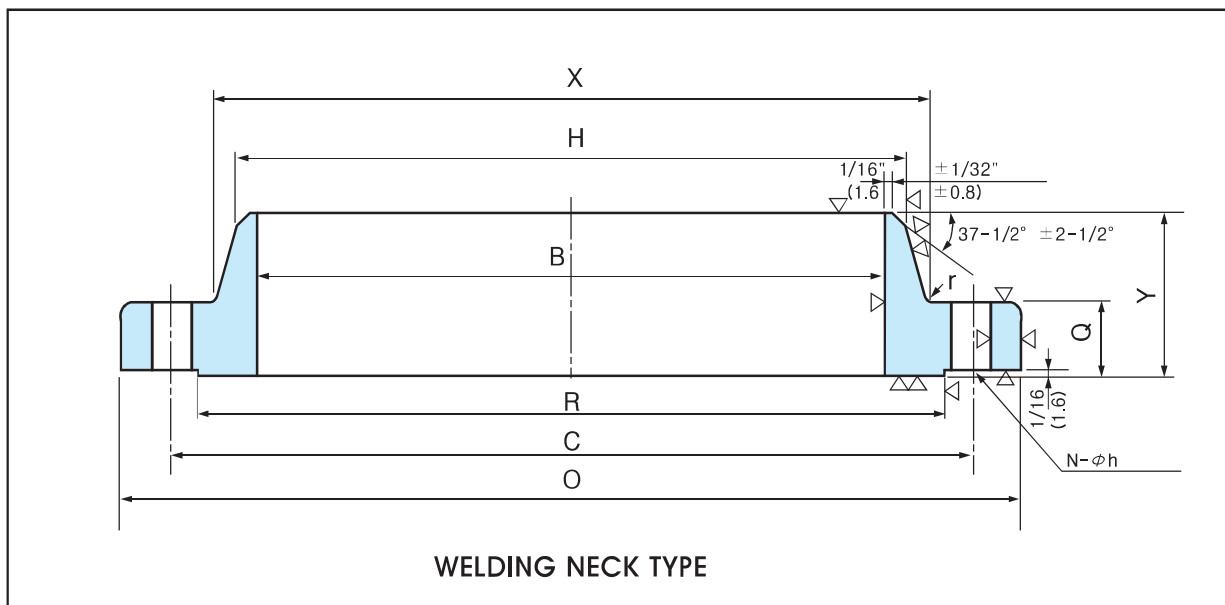
For machining tolerances see ANSI Standard B16.5



Diameter of Hub at Bevel		INSIDE DIAMETER			DRILLING TEMPLATE				Fillet Radius		APPROX WEIGHT		Nominal Pipe Size
		Welding Neck	Slip-On	Bolt Circle Diameter		Number Of Holes	Diam. of Holes	Welding Neck			Slip-On		
									H			B	
mm.	in.		mm.	in.	mm.	in.			mm.	in.			
660.4	26	To be specified by purchaser	666.8	26-1/4	876.3	34-1/2	28	1-7/8	9.5	3/8	241	341	26
711.2	28		717.6	28-1/4	939.8	37	28	1-7/8	9.5	3/8	286	291	28
762.0	30		768.4	30-1/4	997.0	39-1/4	28	1-7/8	9.5	3/8	319	323	30
812.8	32		819.2	32-1/4	1054.1	41-1/2	28	1-7/8	9.5	3/8	359	364	32
863.6	34		870.0	34-1/4	1104.9	43-1/2	28	1-7/8	9.5	3/8	400	405	34
914.4	36		920.8	36-1/4	1168.4	46	32	2-1/8	9.5	3/8	441	441	36
965.2	38		971.6	38-1/4	1219.2	48	32	2-1/8	9.5	3/8	478	478	38
1016.0	40		1022.4	40-1/4	1276.4	50-1/4	36	2-1/8	9.5	3/8	523	534	40
1066.8	42		1073.2	42-1/4	1339.9	52-3/4	36	2-1/8	15.9	5/8	603	591	42
1117.6	44		1124.0	44-1/4	1397.0	55	36	2-1/8	19.1	3/4	648	636	44
1168.4	46		1174.8	46-1/4	1454.2	57-1/4	40	2-1/8	22.2	7/8	694	682	46
1219.2	48		1225.6	48-1/4	1543.1	60-3/4	40	2-1/8	38.1	1-1/2	830	819	48

To be specified by purchaser

TAYLOR FLANGES CLASS-350

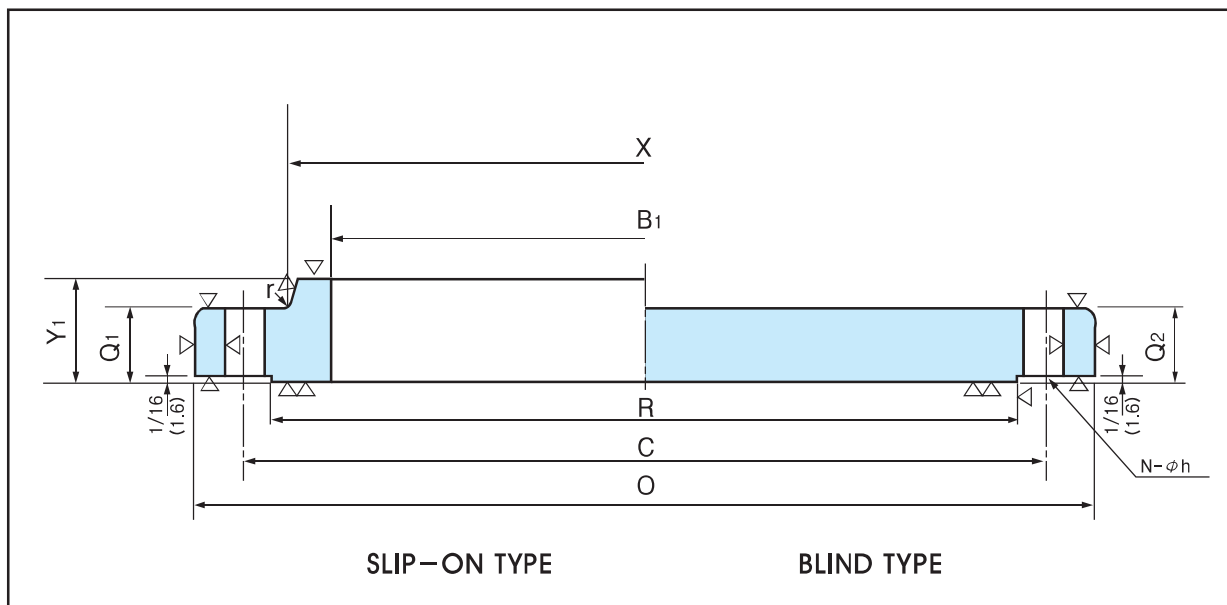


Welding Neck, Slip-on and Blind

Nominal Pipe Size	COMMON DIMENSIONS						THICKNESS Q						LENGHT THRU HUB			
	Outside Diameter of Flange		O.D Raised Face		Outside at Base of Hub		Welding Neck		Slip-On		Blind		Welding Neck		Slip-On	
	O		R		X		Q		Q1		Q2		Y		Y1	
	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.
26	831.9	32-3/4	749.3	29-1/2	708.0	27-7/8	63.5	2-1/2	63.5	2-1/2	69.9	2-3/4	127.0	5	114.3	4-1/2
28	882.7	34-3/4	800.1	31-1/2	758.8	29-7/8	63.5	2-1/2	63.5	2-1/2	73.0	2-7/8	127.0	5	114.3	4-1/2
30	939.8	37	857.3	33-3/4	816.0	32-1/8	66.7	2-5/8	66.7	2-5/8	76.2	3	133.4	5-1/4	120.7	4-3/4
32	990.6	39	908.1	35-3/4	866.8	34-1/8	69.9	2-3/4	69.9	2-3/4	82.6	3-1/4	139.7	5-1/2	127.0	5
34	1041.4	41	958.9	37-3/4	917.6	36-1/8	73.0	2-7/8	73.0	2-7/8	85.7	3-3/8	146.1	5-3/4	130.2	5-1/8
36	1111.3	43-3/4	1022.4	40-1/4	977.9	38-1/2	79.4	3-1/8	79.4	3-1/8	92.1	3-5/8	155.6	6-1/8	142.9	5-5/8
38	1162.1	45-3/4	1073.2	42-1/4	1028.7	40-1/2	79.4	3-1/8	79.4	3-1/8	95.3	3-3/4	155.6	6-1/8	142.9	5-5/8
40	1212.9	47-3/4	1124.0	44-1/4	1079.5	42-1/2	82.6	3-1/4	82.6	3-1/4	101.6	4	158.8	6-1/4	149.2	5-7/8
42	1270.0	50	1181.1	46-1/2	1136.7	44-3/4	88.9	3-1/2	88.9	3-1/2	104.8	4-1/8	165.1	6-1/2	155.6	6-1/8
44	1339.9	52-3/4	1241.4	48-7/8	1187.5	46-3/4	95.3	3-3/4	95.3	3-3/4	111.1	4-3/8	171.5	6-3/4	171.5	6-3/4
46	1390.7	54-3/4	1292.2	50-7/8	1238.3	48-3/4	108.0	4-1/4	108.0	4-1/4	120.7	4-3/4	184.2	7-1/4	184.2	7-1/4
48	1441.5	56-3/4	1343.0	52-7/8	1289.1	50-3/4	108.0	4-1/4	108.0	4-1/4	120.7	4-3/4	184.2	7-1/4	184.2	7-1/4
50																
52	1562.1	61-1/2	1454.2	57-1/4	1397.0	55	108.0	4-1/4					190.5	7-1/2		
54	1612.9	63-1/2	1505.0	59-1/4	1447.8	57	114.3	4-1/2	120.7	4-3/4			196.9	7-3/4	209.6	8-1/4
60	1765.3	69-1/2	1657.4	65-1/4	1600.2	63	114.3	4-1/2	127.0	5			203.2	8	215.9	8-1/2
66	1955.8	77	1838.3	72-3/8	1778.0	70	101.6	4					215.9	8-1/2		
72	2108.2	83	1990.7	78-3/8	1930.4	76	101.6	4					228.6	9		
84	2451.1	96-1/2	2324.1	91-1/2	2260.6	89	127.0	5					254.0	10		
96	2775.0	109-1/4	2638.4	103-7/8	2571.8	101-1/4	158.8	6-1/4					285.8	11-1/4		

Notes:

- (1) Can be furnished. Class 350 flanges in thicknesses over 3 are of ASTM A105 steel.
- (2) Pressure rating-350 psi at-20F to 650F, or 300psi at 750F.
- (3) This designation applies to flanges formerly listed as "300lb. at 750°F" Class 350 flanges are designed in accordance with "Modern Flange Design" (Taylor Forge Bulletin 502) and hence comply in all respects with the current ASME Boiler and Pressure vessel Code.
- (4) Sizes are nominal inside diameters of pipe or shell used with Welding Neck flanges, and nominal outside diameters of pipe of shell used with Slip-On flanges.



Diameter of Hub at Bevel		INSIDE DIAMETER			DRILLING TEMPLATE				Fillet Radius		APPROX WEIGHT			Nominal Pipe Size
		Welding Neck	Slip-On	Bolt Circle Diameter		Number Of Holes	Diam. of Holes	Weld-ing Neck			Slip-On	Blind		
H		B	B ₁		C		N	h	r		Kg	Kg	Kg	
mm.	in.		mm.	in.	mm.	in.			mm.	in.				
660.4	26	To be specified by purchaser	666.8	26-1/4	777.9	30-5/8	28	1-1/8	9.5	3/8	111	102	263	26
711.2	28		717.6	28-1/4	828.7	32-5/8	28	1-1/8	9.5	3/8	118	113	340	28
762.0	30		768.4	30-1/4	885.8	34-7/8	32	1-1/8	9.5	3/8	138	134	404	30
812.8	32		819.2	32-1/4	936.6	36-7/8	36	1-1/8	9.5	3/8	154	147	476	32
863.6	34		870.0	34-1/4	987.4	38-7/8	40	1-1/8	9.5	3/8	170	161	556	34
914.4	36		920.8	36-1/4	1054.1	41-1/2	40	1-1/4	9.5	3/8	218	211	680	36
965.2	38		971.6	38-1/4	1104.9	43-1/2	40	1-1/4	9.5	3/8	231	222	771	38
1016.0	40		1022.4	40-1/4	1155.7	45-1/2	44	1-1/4	9.5	3/8	245	240	896	40
1066.8	42		1073.2	42-1/4	1212.9	47-3/4	48	1-1/4	9.5	3/8	290	281	1009	42
1117.6	44		1124.0	44-1/4	1276.4	50-1/4	44	1-3/8	11.1	7/16	345	345	1191	44
1168.4	46		1174.8	46-1/4	1327.2	52-1/4	48	1-3/8	11.1	7/16	399	399	1338	46
1219.2	48		1225.6	48-1/4	1378.0	54-1/4	48	1-3/8	11.1	7/16	417	417	1497	48
														50
1320.8	52		1327.2	52-1/4	1492.3	58-3/4	52	1-1/2	12.7	1/2	488	—	—	52
1371.6	54		1378.0	54-1/4	1543.1	60-3/4	52	1-1/2	12.7	1/2	544	522	—	54
1524.0	60		1530.4	60-1/4	1695.5	66-3/4	60	1-1/2	12.7	1/2	601	658	—	60
1676.4	66		1682.8	66-1/4	1879.6	74	60	1-5/8	12.7	1/2	760	—	—	66
1828.8	72		1835.2	72-1/4	2032.0	80	72	1-5/8	12.7	1/2	839	—	—	72
2133.6	84		2140.0	84-1/4	2368.6	93-1/4	80	1-3/4	12.7	1/2	1338	—	—	84
2438.4	96		2444.8	96-1/4	2686.1	105-3/4	84	1-7/8	15.9	5/8	1928	—	—	96

- (5) When applied to Welding Neck flanges, these rating are based on inside diameters of pipe or shell as listed in "Nominal Size" column and pipe or shell thicknesses ranging from 1/2" to 1".
When applied to Slip-On flanges, ratings are based on outside diameters of pipe or shell as listed in "Nominal Size" column. Bored to slip over nominal OD pipe, any larger bore will affect the pressure rating.
These flanges have been designed in accordance with "Modern Flange Design" (Taylor Forge Bulletin 722) and hence they comply in all respects with the current ASME Code.
- (6) For machining tolerances see ANSI Standard B16.5.



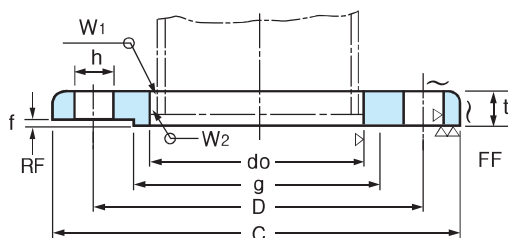
JIS & KS FLANGES

- Class 5K FLANGES
- Class 10K FLANGES
- Class 16K FLANGES
- Class 20K FLANGES
- Class 30K FLANGES
- Class 40K FLANGES
- Class 210Kgf/cm

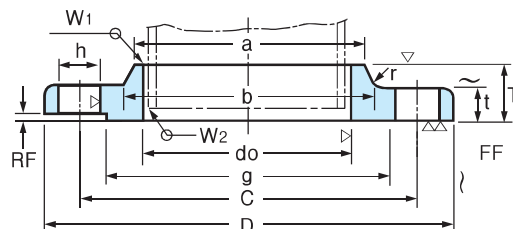


5K KS B1503 JIS B2220

NOMINAL SIZE 10–400mm



NOMINAL SIZE 450–1000mm



Unit : mm

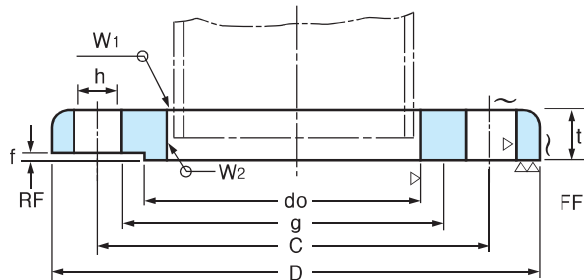
Nominal Bore of Flange	Outside Dia. of Appli- Cable Pipe	Inside Dia. of Flange do	Outside Dia. of Flange D	Sectional Dimensions of Flange						Dia. of Bolt				Nomi- nal Bolt Size	Welding		Weight (Kg)
				t	T	Dia. of Hub		Rad- ius	Raised Face	Dia. of Raised Face g	Dia. of Bolt Circle C	Number of Bolt Holes	Hole Dia. h		W1	W2	
(10)	17.3	17.8	75	9	—	—	—	—	1	39	55	4	12	M10	5	2.5	0.27
15	21.7	22.2	80	9	—	—	—	—	1	44	60	4	12	M10	5	3	0.30
(20)	27.2	27.7	85	10	—	—	—	—	1	49	65	4	12	M10	5	3	0.37
25	34.0	34.5	95	10	—	—	—	—	1	59	75	4	12	M10	5	3	0.45
(32)	42.7	43.2	115	12	—	—	—	—	2	70	90	4	15	M12	6	3	0.78
40	48.6	49.1	120	12	—	—	—	—	2	75	95	4	15	M12	6	3	0.83
50	60.5	61.1	130	14	—	—	—	—	2	85	105	4	15	M12	6	3	1.07
65	76.3	77.1	155	14	—	—	—	—	2	110	130	4	15	M12	6	4	1.49
80	89.1	90.0	180	14	—	—	—	—	2	121	145	4	19	M16	6	4	1.99
(90)	101.6	102.6	190	14	—	—	—	—	2	131	155	4	19	M16	6	4	2.09
100	114.3	115.4	200	16	—	—	—	—	2	141	165	8	19	M16	7	4	2.39
125	139.8	141.2	235	16	—	—	—	—	2	176	200	8	19	M16	7	4	3.23
150	165.2	166.6	265	18	—	—	—	—	2	206	230	8	19	M16	7	5	4.41
(175)	190.7	192.1	300	18	—	—	—	—	2	232	260	8	23	M20	7.5	5	5.51
200	216.3	218.0	320	20	—	—	—	—	2	252	280	8	23	M20	8.5	6	6.33
(225)	241.8	243.7	345	20	—	—	—	—	2	277	305	12	23	M20	9	6	6.64
250	267.4	269.5	385	22	—	—	—	—	2	317	345	12	23	M20	10	6	9.45
300	318.5	321.0	430	22	—	—	—	—	3	360	390	12	23	M20	10	6	10.30
350	355.6	358.1	480	24	—	—	—	—	3	403	435	12	25	M22	12	7	14.00
400	406.4	409.0	540	24	—	—	—	—	3	463	495	16	25	M22	12	7	16.90
450	457.2	460.0	605	24	40	495	500	5	3	523	555	16	25	M22	12	7	24.80
500	508.0	511.0	655	24	40	546	552	5	3	573	605	20	25	M22	12	7	26.90
550	558.8	562.0	720	26	42	597	603	5	3	630	665	20	27	M24	12	7	34.10
600	609.6	613.0	770	26	44	648	654	5	3	680	715	20	27	M24	12	7	37.50
650	660.4	664.0	825	26	48	702	708	5	3	735	770	24	27	M24	12	7	42.80
700	711.2	715.0	875	26	48	751	758	5	3	785	820	24	27	M24	12	7	45.40
750	762.0	766.0	945	28	52	802	810	5	3	840	880	24	33	M30	12	7	57.40
800	812.8	817.0	995	28	52	854	862	5	3	890	930	24	33	M30	13	8	60.80
850	863.6	868.0	1045	28	54	904	912	5	3	940	980	24	33	M30	13	8	63.50
900	914.4	919.0	1095	30	56	956	964	5	3	990	1030	24	33	M30	13	8	75.30
1000	1016.0	1021.0	1195	32	60	1058	1066	5	3	1090	1130	28	33	M30	14	9	88.50
* (1100)	1117.6	1123	1305	32	—	—	—	—	3	1200	1240	28	33	M30			
* 1200	1219.2	1225	1420	34	—	—	—	—	3	1305	1350	32	33	M30			
* 1350	1371.6	—	1575	34	—	—	—	—	3	1460	1505	32	33	M30			
* 1500	1524.0	—	1730	36	—	—	—	—	3	1615	1660	36	33	M30			

1. Flanges of parenthesized nominal diameter had letter not be used.
2. The facing of flanges shall conform to KS B1519(JIS B2202) 1987.
3. Nominal diameter over 1000 is manufacturer's standard(*).

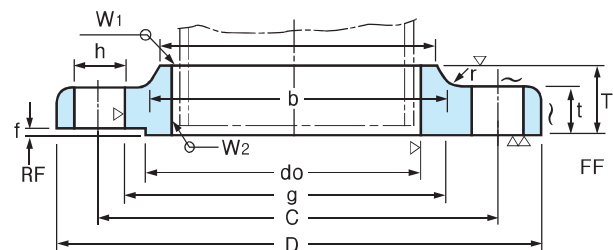


10K KS B1503 JIS B2220

NOMINAL SIZE 10–225mm



NOMINAL SIZE 250–1000mm



Unit : mm

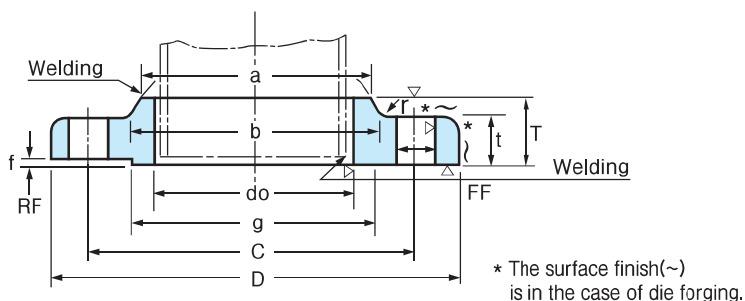
Nominal Dia. of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange do	Outside Dia. of Flange D	Sectional Dimensions of Flange							Bolt Hole			Nomi- nal Bolt Size	Weld Length (Reference)		Approx. Weight (Kg/w)
				t	T	Dia. of Hub		Rad- ius r	Raised Face f	Dia. of Raised Face g	Bolt Circle Dia. C	Number of Bolt Holes	Hole Dia. h		W1	W2	
						a	b										
10	17.3	17.8	90	12	—	—	—	—	1	46	65	4	15	M12	5	2.5	0.52
15	21.7	22.2	95	12	—	—	—	—	1	51	70	4	15	M12	5	3	0.57
20	27.2	27.7	100	14	—	—	—	—	1	56	75	4	15	M12	5	3	0.73
25	34.0	34.5	125	14	—	—	—	—	1	67	90	4	19	M16	5	3	1.13
32	42.7	43.2	135	16	—	—	—	—	2	76	100	4	19	M16	6	3	1.48
40	48.6	49.1	140	16	—	—	—	—	2	81	105	4	19	M16	6	3	1.56
50	60.5	61.1	155	16	—	—	—	—	2	96	120	4	19	M16	6	3	1.88
65	76.3	77.1	175	18	—	—	—	—	2	116	140	4	19	M16	6.5	4	2.6
80	89.1	90.0	185	18	—	—	—	—	2	126	150	8	19	M16	6.5	4	2.61
(90)	101.6	102.6	195	18	—	—	—	—	2	136	160	8	19	M16	6.5	4	2.76
100	114.3	115.4	210	18	—	—	—	—	2	151	175	8	19	M16	7	4	3.14
125	139.8	141.2	250	20	—	—	—	—	2	182	210	8	23	M20	7.5	4	4.77
150	165.2	166.6	280	22	—	—	—	—	2	212	240	8	23	M20	8	5	6.34
(175)	190.7	192.1	305	22	—	—	—	—	2	237	265	12	23	M20	9	5	6.82
200	216.3	218.0	330	22	—	—	—	—	2	262	290	12	23	M20	9	6	7.53
(225)	241.8	243.7	350	22	—	—	—	—	2	282	310	12	23	M20	9	6	7.74
250	267.4	269.5	400	24	36	288	292	6	2	324	355	12	25	M22	10	6	12.7
300	318.5	321.0	445	24	38	340	346	6	3	368	400	16	25	M22	10	6	13.8
350	355.6	358.1	490	26	42	380	386	6	3	413	445	16	25	M22	12	7	18.2
400	406.4	409.0	560	28	44	436	442	6	3	475	510	16	27	M24	12	7	25.2
450	457.2	460.0	620	30	48	496	502	6	3	530	565	20	27	M24	14	8	33
500	508.0	511.0	675	30	48	548	554	6	3	585	620	20	27	M24	14	8	37.6
550	558.8	562.0	745	32	52	604	610	6	3	640	680	20	33	M30	15	9	49.7
600	609.6	613.0	795	32	52	656	662	6	3	690	730	24	33	M30	16	10	52.6
650	660.4	664.0	845	34	56	706	712	6	3	740	780	24	33	M30	16	10	60.6
700	711.2	715.0	905	34	58	762	770	6	3	800	840	24	33	M30	17	10	70.6
750	762.0	766.0	970	36	62	816	824	6	3	855	900	24	33	M30	18	11	85.8
800	812.8	817.0	1020	36	64	868	876	6	3	905	950	28	33	M30	19	12	91.2
(850)	863.6	868.0	1070	36	66	920	928	6	3	955	1000	28	33	M30	19	12	98.6
900	914.4	919.0	1120	38	70	971	979	6	3	1005	1050	28	33	M30	22	14	109
1000	1016.0	1021.0	1235	40	74	1073	1081	6	3	1110	1160	28	39	M36	22	14	133
*(1100)	1117.6	1123	1345	42	76	—	—	—	3	1220	1270	28	39	M36			
* 1200	1219.2	1225	1465	44	78	—	—	—	3	1325	1380	32	39	M36			
* 1350	1371.6	—	1630	48	82	—	—	—	3	1480	1540	36	45	M42			
* 1500	1524.0	—	1795	50	90	—	—	—	3	1635	1700	40	45	M42			

1. Flanges of parenthesized nominal diameter had letter not be used.
2. The facing of flanges shall conform to KS B1519(JIS B2202) 1987.
3. Nominal diameter over 1000 is manufacturer's standard(*).

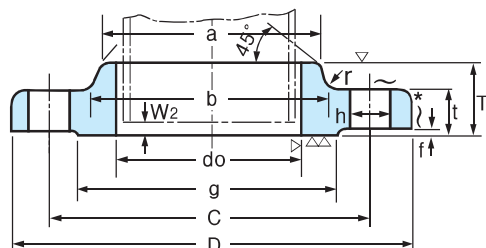


16K KS B1503 JIS B2220

NOMINAL SIZE 10–600mm



NOMINAL SIZE 650–1200mm



Unit : mm

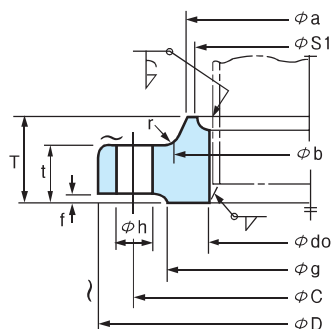
Nominal Dia. of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange do	Outside Dia. of Flange D	Sectional Dimensions of Flange							Bolt Hole			Nomi- nal Bolt Size	Approx. Weight (Kg)
				t	T	Dia. of Hub		Radius r	Raised Face f	Dia.of Raised Face g	Bolt Circle dia. C Dia.	Number of Bolt Holes	Hole Dia. h		
						a	b								
10	17.3	17.8	90	12	16	26	28	4	1	46	65	4	15	M12	0.52
15	21.7	22.2	95	12	16	30	32	4	1	51	70	4	15	M12	0.58
20	27.2	27.7	100	14	20	38	42	4	1	56	75	4	15	M12	0.75
25	34.0	34.5	125	14	20	46	50	4	1	67	90	4	19	M16	1.16
32	42.7	43.2	135	16	22	56	60	5	2	76	100	4	19	M16	1.53
40	48.6	49.1	140	16	24	62	66	5	2	81	105	4	19	M16	1.64
50	60.5	61.1	155	16	24	76	80	5	2	96	120	8	19	M16	1.83
65	76.3	77.1	175	18	26	94	98	5	2	116	140	8	19	M16	2.58
80	89.1	90.0	200	20	28	108	112	6	2	132	160	8	23	M20	3.66
(90)	101.6	102.6	210	20	30	120	124	6	2	145	170	8	23	M20	3.95
100	114.3	115.4	225	22	34	134	138	6	2	160	185	8	23	M20	4.94
125	139.8	141.2	270	22	34	164	170	6	2	195	225	8	25	M22	7.00
150	165.2	166.6	305	24	38	196	202	6	2	230	260	12	25	M22	9.62
200	216.3	218.0	350	26	40	244	252	6	2	275	305	12	25	M22	12.1
250	267.4	269.5	430	28	44	304	312	6	2	345	380	12	27	M24	20.0
300	318.5	321.0	480	30	48	354	364	8	3	395	430	16	27	M24	24.4
350	355.6	358.1	540	34	52	398	408	8	3	440	480	16	33	M30×3	35.0
400	406.4	409.0	605	38	60	446	456	10	3	495	540	16	33	M30×3	46.2
450	457.2	460.0	675	40	64	504	514	10	3	560	605	20	33	M30×3	61.9
500	508.0	511.0	730	42	68	558	568	10	3	615	660	20	33	M30×3	73.25
(550)	558.8	562.0	795	44	70	612	622	10	3	670	720	20	39	M36×3	88.1
600	609.6	613.0	845	46	74	666	676	10	3	720	770	24	39	M36×3	98.8
(650)	660.4	664	895	48	77	704	726	10	5	770	820	24	39	M36×3	101
700	711.2	715	960	50	80	754	776	10	5	820	875	24	42	M39×3	120
750	762.0	766	1020	52	83	806	832	10	5	880	935	24	42	M39×3	141
800	812.8	817	1085	54	86	865	885	10	5	930	990	24	48	M45×3	161
850	863.6	868	1135	56	89	916	936	10	5	980	1040	24	48	M45×3	177
900	914.4	919	1185	58	93	968	986	10	5	1030	1090	28	48	M45×3	191
1000	1016.0	1021	1320	62	99	1070	1098	12	5	1140	1210	28	56	M52×3	230
(1100)	1117.6	1123	1420	66	105	1180	1200	12	5	1240	1310	32	56	M52×3	289
1200	1219.2	1225	1530	70	112	1282	1302	12	5	1350	1420	32	56	M52×3	348

1. Flanges of parentheses nominal diameter had better not be used.
2. The facing of flanges shall conform to KS B1519 (JIS B2202) 1987.
3. The dimension of flange of 650A and larger in nominal sizes excluding 850A, are in accordance with the nominal pressure 25 BAR specified in ISO2084-1974.

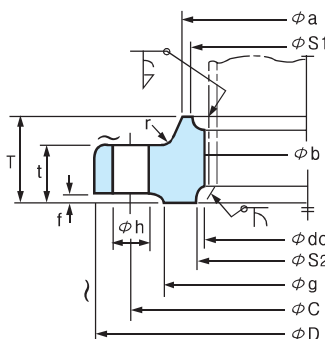


20K KS B1503 JIS B2220

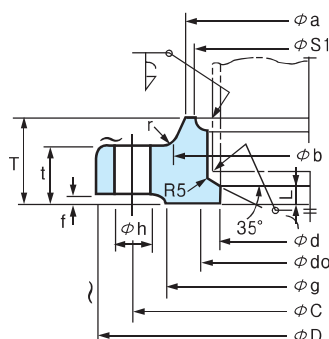
TYPE A
NOMINAL SIZE 10–50mm



TYPE B
NOMINAL SIZE 10–50mm



TYPE C
NOMINAL SIZE 65–600mm



* The surface finish(~~) is in the case of die forging.

Unit : mm

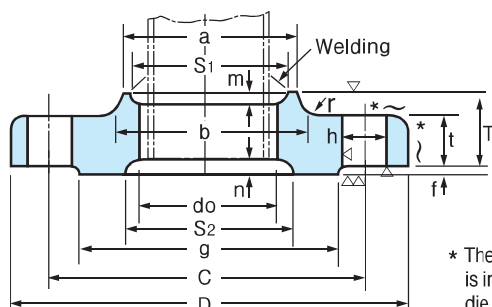
Nominal Dia. of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange do	Outside Dia. of Flange D	Sectional Dimensions of Flange								Bolt Hole			Nomi- nal Bolt Size	Reference					Approx Weight (Kg)
				t	T	Dia. of Hub		Rad- ius r	Raised Face f	Dia.of Raised Face g	Inside Dia. of Flange d	Dia.of Bolt Circle C	Num- ber of Bolt Holes	Hole Dia. h		S1	m	S2	n	l	
						a	b														
10	17.3	17.8	90	14	20	30	32	4	1	46	—	65	4	15	M12	27	4	27	4	—	0.59
15	21.7	22.2	95	14	20	34	36	4	1	51	—	70	4	15	M12	31	4	31	4	—	0.65
20	27.2	27.7	100	16	22	40	42	4	1	56	—	75	4	15	M12	37	4	37	4	—	0.81
25	34.0	34.5	125	16	24	48	50	4	1	67	—	90	4	19	M16	44	4	44	4.5	—	1.29
32	42.7	43.2	135	18	26	56	60	5	2	76	—	100	4	19	M16	52	4	53	5	—	1.60
40	48.6	49.1	140	18	26	62	66	5	2	81	—	105	4	19	M16	58	4	59	5.5	—	1.69
50	60.5	61.1	155	18	26	76	80	5	2	96	—	120	8	19	M16	70	4	72	5.5	—	1.89
65	76.3	77.1	175	20	30	100	104	5	2	116	65.9	140	8	19	M16	94	6	—	—	6	2.60
80	89.1	90.0	200	22	34	113	117	6	2	132	78.1	160	8	23	M20	107	6	—	—	6	3.93
(90)	101.6	102.6	210	24	36	126	130	6	2	145	90.2	170	8	23	M20	120	6	—	—	6	4.56
100	114.3	115.4	225	24	36	138	142	6	2	160	102.3	185	8	23	M20	132	6	—	—	6	5.13
125	139.8	141.2	270	26	40	166	172	6	2	195	126.6	225	8	25	M22	160	7	—	—	6	8.30
150	165.2	166.6	305	28	42	196	202	6	2	230	151.0	260	12	25	M22	186	8	—	—	6	10.6
200	216.3	218.0	350	30	46	244	252	6	2	275	199.9	305	12	25	M22	237	9	—	—	6	13.3
250	267.4	269.5	430	34	52	304	312	6	2	345	248.8	380	12	27	M24	290	10	—	—	6	23.4
300	318.5	321.0	480	36	56	354	364	8	3	395	297.9	430	16	27	M24	345	11	—	—	6	27.7
350	355.6	358.1	540	40	62	398	408	8	3	440	333.4	480	16	33	M30×3	384	12	—	—	6	39.2
400	406.4	409.0	605	46	70	446	456	10	3	495	381.0	540	16	33	M30×3	437	13	—	—	7	54.2
450	457.2	460.0	675	48	78	504	514	10	3	560	431.8	605	20	33	M30×3	490	15	—	—	7	71.7
500	508.0	511.0	730	50	84	558	568	10	3	615	482.6	660	20	33	M30×3	544	16	—	—	7	86.2
(550)	558.8	562.0	795	52	90	612	622	10	3	670	533.4	720	20	39	M36×3	595	16	—	—	7	105
600	609.6	613.0	845	54	96	666	676	10	3	720	584.2	770	24	39	M36×3	646	18	—	—	7	119
* 650	660.4	664	945	60					5	790		850	24	48	M45×3						
* 700	711.2	715	995	64					5	840		900	24	48	M45×3						
* 750	762.0	766	1080	68					5	900		970	24	56	M52×3						
* 800	812.8	817	1140	72					5	960		1030	24	56	M52×3						
* 850	863.6	868	1200	74					5	1020		1090	24	56	M52×3						
* 900	941.4	919	1250	76					5	1070		1140	28	56	M52×3						

1. Flanges of parenthesized nominal diameter had better not be used.
2. "d" is an example of pipe thickness for schedule 40 for nominal diameter 400 and under, and for schedule 12.7mm for 450 through 600 of KS D3562 and KS D3507 (JIS G3454, JIS G3456).
3. The dimension of the notch (m, N, S₁, S₂) for welding can decided between concerned parties.
4. Nominal diameter over 600 is manufacturer's standard.

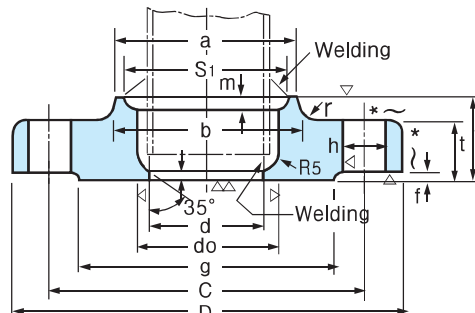


30K KS B1503 JIS B2220 Slip-On

NOMINAL SIZE 10–50mm (TYPE B)



NOMINAL SIZE 65–400mm (TYPE C)



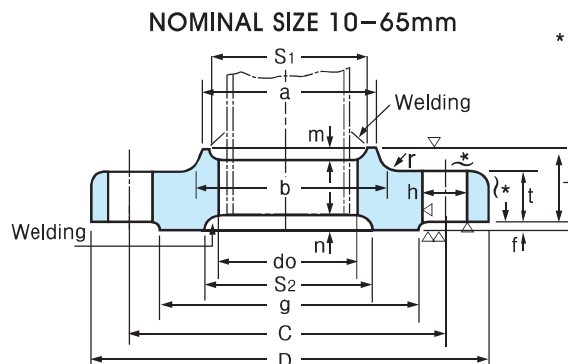
Unit : mm

Nominal Dia. of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange d _o	Outside Dia. of Flange D	Sectional Dimensions of Flange								Bolt Hole			Nomi- nal Bolt Size	Reference					Approx Weight (Kg)
				t	T	Dia. of Hub		Rad- ius r	f	g	d	Bolt Circle Dia. C	Num- ber of Bolt Holes	Hole Dia. h		S ₁	m	S ₂	n	l	
						a	b														
10	17.3	17.8	110	16	24	30	34	4	1	52	—	75	4	19	M16	—	—	—	—	—	0.99
15	21.7	22.2	115	18	26	36	40	5	1	55	—	80	4	19	M16	31	4	40	5	—	1.23
20	27.2	27.7	120	18	28	42	46	5	1	60	—	85	4	19	M16	37	5	44	5	—	1.34
25	34.0	34.5	130	20	30	50	54	5	1	70	—	95	4	19	M16	55	6	52	5	—	1.76
32	42.7	43.2	140	22	32	60	64	6	2	80	—	105	4	19	M16	52	6	60	5	—	2.15
40	48.6	49.1	160	22	34	66	70	6	2	90	—	120	4	23	M20	58	6	66	5	—	2.82
50	60.5	61.1	165	22	36	82	86	6	2	105	—	130	8	19	M16	70	6.5	78	5	—	2.89
65	76.3	77.1	200	26	40	102	106	8	2	130	65.9	160	8	23	M20	96	9.5	94	5	6	4.70
80	89.1	90.0	210	28	44	115	121	8	2	140	78.1	170	8	23	M20	109	9.5	—	—	6	5.36
(90)	101.6	102.6	230	30	46	128	134	8	2	150	90.2	185	8	25	M22	122	9.5	—	—	6	6.85
100	114.3	115.4	240	32	48	141	147	8	2	160	102.3	195	8	25	M22	135	9.5	—	—	6	7.89
125	139.8	141.2	275	36	54	166	172	8	2	195	126.6	230	8	25	M22	160	9.5	—	—	6	11.4
150	165.2	166.6	325	38	58	196	204	8	2	235	151.0	275	12	27	M24	186	9.5	—	—	6	16.7
200	216.3	218.0	370	42	64	248	256	8	2	280	199.9	320	12	27	M24	237	9.5	—	—	6	20.6
250	267.4	269.5	450	48	72	306	314	10	2	345	248.8	390	12	22	M30	290	10	—	—	6	36.1
300	318.5	321.0	515	52	78	360	370	10	3	405	297.9	450	16	33	M30	345	12	—	—	6	49.9
350	355.6	358.1	560	54	84	402	412	12	3	450	333.4	495	16	33	M30	383	13	—	—	6	61.2
400	406.4	409.0	630	60	92	456	468	15	3	510	381.0	560	16	39	M36	435	14	—	—	7	85.2

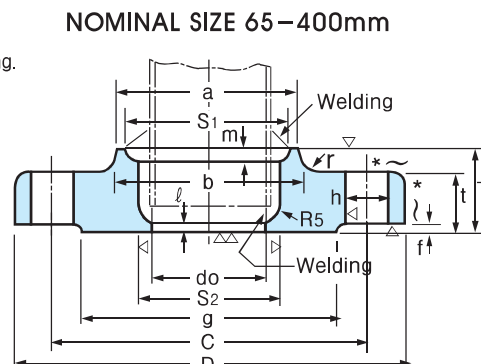
1. Flanges of parenthesized nominal diameter had better not be used.
2. "d" is an example of pipe thickness for schedule 40 of KS D3562 and KS D3507 (JIS G3454, JIS G3456).
if required, purchaser can specify for other pipe wall thickness.
3. This diameters of bolt holes(h) shall be in accordance with Class 3 of KS B1007 (Grade 3 of JIS B1001) where the nominal designation of screw thread of bolt is not more than M16, and in accordance with Class 2 of KS B1007 (Grade 2 of JIS B1001) where the nominal designation of screw thread of bolt is not less than M30 × 3.
4. The dimension of the notch (m, n, S1, S2) for welding can decide between concerned parties agreement between parties concerned.



40 Kg/Cm² JIS B2216 40Kg/cm² SLIP-ON WELDING PIPE FLANGES



* The surface finish is in the case of forging. (△:In other cases)



Unit : mm

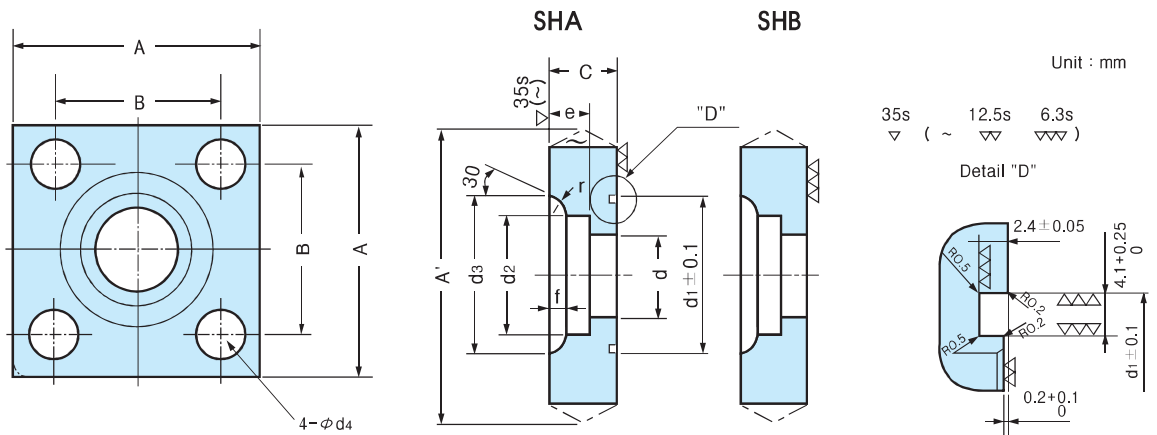
Nominal Diameter of Flange	Outside Dia. of Steel Pipe	Inside Dia. of Flange do	Outside Dia. of Flange D	Sectional Dimensions of Flange								Bolt Hole			Nomi- nal Bolt Size	Reference					Approx. Weight (Kg)
				t	T	Dia. of Hub		Rad - us r	f	g	d	Bolt Circle Dia. C	Num-ber of Bolt Holes	Hole Dia. h		S1	m	S2	n	l	
						a	b														
10	17.3	17.8	110	18	26	34	38	5	1	52	—	75	4	19	M16	28.0	6	28.0	5		1.11
15	21.7	22.2	115	20	30	39	43	5	1	55	—	80	4	19	M16	32.5	6	32.5	5		1.39
20	27.2	27.7	120	20	30	45	49	5	1	60	—	85	4	19	M16	38.0	6	38.0	5		1.51
25	34.0	34.5	130	22	32	55	59	5	1	70	—	95	4	19	M16	47.8	6	47.8	5		1.97
32	42.7	43.2	140	24	35	64	68	6	2	80	—	105	4	19	M16	56.5	6	56.5	5		2.50
40	48.6	49.1	160	24	35	70	74	6	2	90	—	120	4	23	M20	62.5	6	62.5	5		3.26
50	60.5	61.1	165	26	38	86	90	6	2	105	—	130	8	19	M16	74.5	6	74.5	5.5		3.47
65	76.3	77.1	200	30	44	106	110	8	2	130	62.3	160	8	23	M20	91.5	7	91.5	7		5.97
80	89.1	90.3	210	32	46	118	124	8	2	140	73.9	170	8	23	M20	105.5	7.5	105.5	7		6.76
100	114.3	115.5	250	36	52	145	151	8	2	165	97.1	205	8	25	M22	133.0	8.5	133.0	7		10.48
125	139.8	141.4	300	40	58	182	188	8	2	200	120.8	250	8	27	M24	160.5	9.5	160.5	7		16.97
150	165.2	167.0	355	44	64	200	208	8	2	240	143.2	295	12	33	M30	188.0	11	188.0	7		22.6
200	216.3	218.2	405	50	72	255	263	8	2	290	190.9	345	12	33	M30	243.0	13	243.0	7		34.9
250	267.4	269.5	475	56	80	310	318	10	2	355	237.2	410	12	33	M30	298.0	15	298.0	7		41.1

REMARKS :

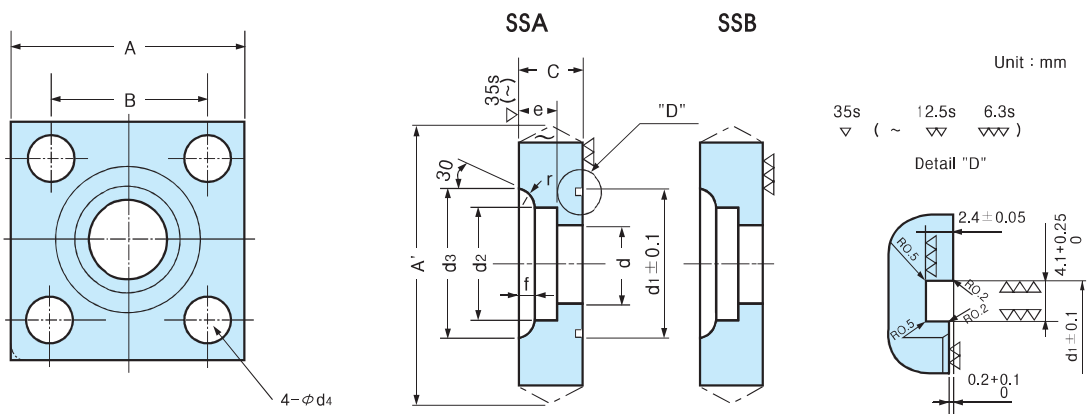
1. As far as possible, nominal diameter in parenthesis should be avoid from use.
2. The dimensional tolerance shall confirm to JIS B2203.
3. The flange gasket surface is based on large raised facing specified in JIS B2202. But, if necessary, facings other than the large raised facing specified in JIS B2201 can be designated by customers.
4. Size d is an example of pipe thickness for schedule 40 of JIS G3454 and JIS G3456. When other size is necessary, customer can order it at will.
5. Refer to JIS B2216.



210kgf/cm² (JIS B2291 SQUARE FLANGES) FLANGE FOR OIL PRESSURE



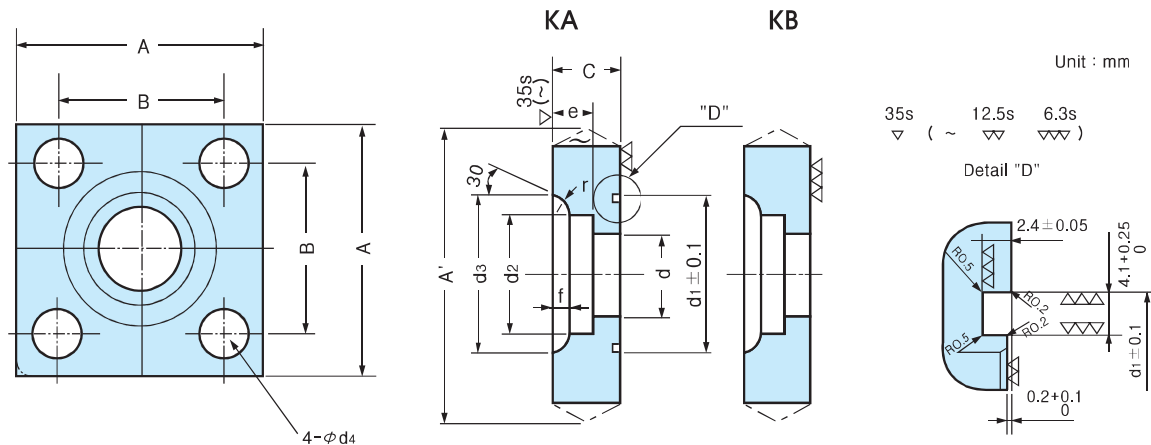
Nominal Bore	A		A' (MAX)	B		C		d	d ₁		d ₂		e	d ₃	d ₄	f	r	Weight (Kg)	G계열 O형
15	63	±1	67	40	±0.2	22	0	16	30	±0.1	22.2	+0.2	11	32	11	3.5	5	0.6	G25
20	68		72	45		22	-1	20	35		27.7	0	12	38	11	4.0	5	0.7	G30
25	80	±1.2	85	53		28	0	25	40		34.5	+0.3	14	45	13	4.0	5	1.2	G35
32	90		95	63		28	-1.5	31.5	45		43.2		16	56	13	6.0	5	1.5	G40
40	100	±1.5	106	70	±0.4	36		37.5	55		49.1	0	18	63	18	7.0	5	2.4	G50
50	112		118	80		36		0	47.5		65		61.1	20	75	18	7.0	5	2.8
65	140	±2	148	100		45	-2	60	80		77.1	+0.4	22	95	22	9.5	6	5.3	G75
80	155		163	112		45			71		90	90.0	0	25	108	24	11.0	6	6.2



Nominal Bore	A		A' (MAX)	B		C		d	d ₁		d ₂		e	d ₃	d ₄	f	r	Weight (Kg)
15	54	±1	58	36	±0.2	22	0	16	30	±0.1	22.2	+0.2	11	32	11	3.5	5	0.5
20	58		62	40		22	−1	20	35		27.7	0	12	38	11	4.0	5	0.6
25	68	±1.2	73	48		28	0	25	40		34.5		14	45	13	4.0	5	0.8
32	76		81	56		28	−1.5	31.5	45		43.2		16	56	13	6.0	5	1.0
40	92	±1.5	98	65	±0.4	36		37.5	55		49.1	0	18	63	18	7.0	5	1.9
50	100		106	73		36		0	47.5		65	61.1	20	75	18	7.0	5	2.0
65	128	±2	136	92		45	−2	60	80		77.1	+0.4	22	95	22	9.5	6	4.1
80	140		148	103		45		71	90		90.0	0	25	108	24	11.0	6	4.7

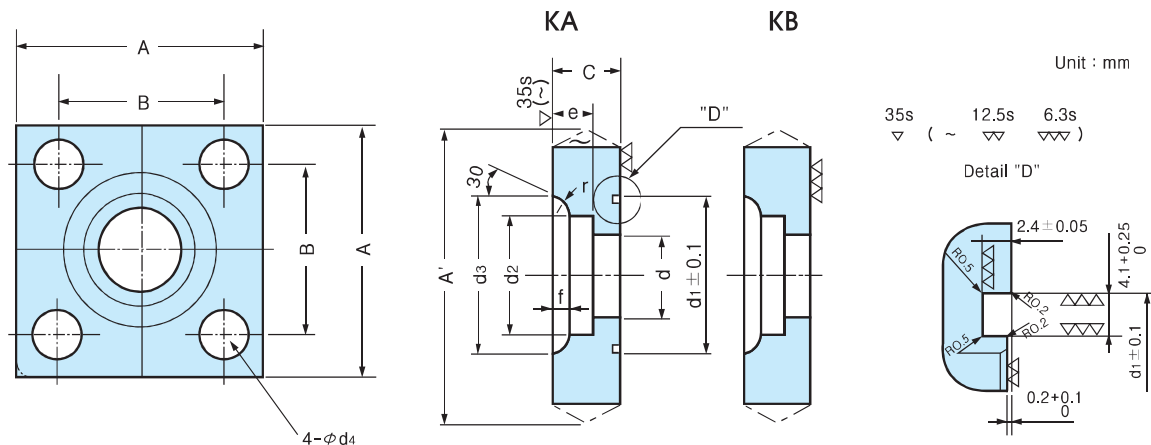


280kgf/cm² (JIS F7806 SQUARE FLANGES) FLANGE FOR OIL PRESSURE



Nominal Bore	A		A' (MAX)	B		C		d	d ₁		d ₂		e	d ₃	d ₄	f	r	Weight (Kg)
15	66	±1	70	43	±0.2	22	0	12.3	24	±0.1	22.2	+0.2	12	34	11	4.0	5	0.63
20	72		76	48		25	−1	16.2	30		27.7	0	12	40	11	4.5	5	0.85
25	85	±1.2	91	58		35	0	21.2	35		34.5	+0.3	14	48	13.5	5.0	5	1.64
32	98		104	68		35	−1.5	29.9	45		43.2		18	60	17.5	6.5	5	2.03
40	105	±1.5	112	74	40	0	34.4	50	49.1		0		20	66	17.5	7.5	5	2.66
50	130		139	90	50		43.1	60	61.1		20		79	22	8.0	5	5.14	
65	150	±2	161	108	60		−2	57.3	75		77.1	+0.4	25	100	24	10.0	6	7.95
80	170		181	120	65			66.9	85		90.0	0	25	114	26	12.0	6	11.0

350kgf/cm² (JIS F7806 SQUARE FLANGES) FLANGE FOR OIL PRESSURE

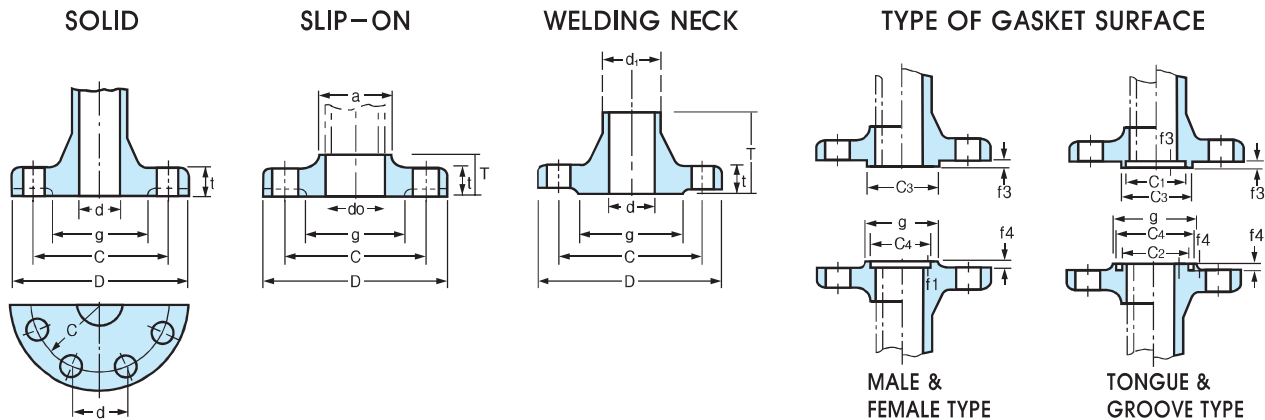


Nominal Bore	A		A' (MAX)	B		C		d	d ₁		d ₂		e	d ₃	d ₄	f	r	Weight (Kg)
15	68	± 1.2	73	45	± 0.2	28	0	12.3	24	± 0.1	22.2	+0.2	12	37.5	11	4	5	0.88
20	82		87	55		30		16.2	30		27.7	0	12	43.5	13.5	5	5	1.34
25	95		101	65		35		21.2	35		34.5	14	53	17.5	5.5	6	2.02	
32	100	± 1.5	106	70		35	23.3	40	43.2		+0.3	18	63	17.5	7	6	2.16	
40	105		112	75	42	28.2	45	49.1	0		20	70	17.5	8	6	2.84		
50	132		140	92	50	38.3	55	61.1	25		84	22	9	6	5.30			
65	160	± 2	170	112	± 0.4	60	-2	48.3	65		77.1	+0.4	30	105	26	12	7	9.92
80	190		202	130		68		58.7	75		90.0	0	30	120	33	13.5	7	14.8



TOLERANCE FOR PIPE FLANGES

KS B1502
JIS B2203



Unit : mm

Flange Section	Surface Condition	Basic Size	Dimensional Tolerance
Outside Dia. D	As Forged (1)	300 & below	+Not Specified
		over 300 thru 600	-2.0
		over 600 thru 1000	+Not Specified
	Finish	over 1000 thru 1500	-3.0
		300 & below	±1
		over 300 thru 600	±1.5
Inside Dia. d(2)	Solid Flange d(2)	over 600 thru 1000	±2
		over 1000 thru 1500	±2.5
		over 1500	±3
	Slip-on Flange do	16 & below	±1
		over 16 thru 63	±1.5
		over 63 thru 125	±2
	Welding Neck Flange d	over 125 thru 150	±2.5
		over 250 thru 500	±3
		over 500 thru 1000	±4
		over 1000	±5
	Finish	100 & below	+0.5 0
		over 100 thru 400	+1 0
		over 400 thru 600	+1.5 0
		over 600 thru 800	+2 0
		over 800 thru 1000	+2.5 0
		over 1000	+3 0
		100 & below	0 -0.5
		over 100 thru 400	0 -1
		over 400 thru 600	0 -1.5
		over 600 thru 800	0 -2
		over 800 thru 1000	0 -2.5
		over 1000	0 -3
Bolt Hole	Bolt Circle Dia. C	250 & below	±0.5
		over 250 thru 550	±0.6
		over 550 thru 950	±0.8
		over 950 thru 1350	±1
		over 1350	±1.5

Flange Section	Surface Condition	Basic Size	Dimensional Tolerance
Bolt Hole	Pitch of Hole p	Drilling Hole	—
Dia of Hub	Slip-on Flange (a)	As Forged	220 & below
			over 220 thru 450
			over 450 thru 650
			over 650 thru 850
			over 850 thru 1000
			over 1000
	Welding Neck Flange (d1)	Finish	220 & below
			over 220 thru 450
			over 450 thru 650
			over 650 thru 850
			over 850 thru 1000
			over 1000
Gasket Seat	C1, C2, C3, C4	Finish	500 & below
			over 500 thru 1000
			over 1000 thru 1500
	f4 f3	Finish	over 1500
			8 & below
			over 8
Thickness t	g	Finish	200 & below
			over 200 thru 650
			over 650 thru 1000
			over 1000
	One-side Finish	Both-side Finish	20 & below
			over 20 thru 50
			over 50 thru 100
			20 & below
			over 20 thru 50
			over 50 thru 100
Hub Height T	Flange with Pipe Inserted	Finish	50 & below
			over 50 thru 100
	Flange with Butt-welded Pipe	Finish	over 100 thru 200
			over 200 & below
			over 200 thru 300

Notes:

- (1) This dimensional tolerance applies to the machined surface, as required.
- (2) This dimension d has been specified only for the flange, of which the bore part is cylindrical in shape.

Remarks

- (1) The dimensions d of bore part of the solid flanges with surface, as forged of valves, pumps, etc. are allowed up to plus 100% of the above dimensional tolerance. Provided that the required thickness shall be free from its influence.
- (2) The thickness of flange of valve and the like, of which the dimension between flange faces is limited to a fixed value, are allowed up to plus 100% of the above dimensional tolerance in the column of thickness.
- (3) In the case of spot facing of the single surface finishing, the thickness of spot facing is allowed up to 70% of the dimensional tolerance in the above column of thickness in negative side.
- (4) The chain double-dashed lines in the figures of solid flange and socket welding type flange illustrate the cases of large raised face flange.



CPS STANDARD MARKING

