www.juchan.co.kr

F·O·R·G·E·D **FLANGES**








JU CHAN CORP.

HEAD OFFICE & FACTORY
#862-9, SANGDONG-RO, SANGDONG-MYEON,
GIMHAE-CITY, GYEONGNAM, KOREA
TEL : +82-55-314-7970 FAX : +82-55-314-9991
E-mail : sales@juchan.co.kr
Homepage : www.juchan.co.kr

BUSAN OFFICE
WOONAM TOWER 13F, #1942, JUNGANG-DAE RO,
GEUMJEONG-GU, BUSAN-CITY, KOREA
TEL : +82-51-555-7970 FAX : +82-55-314-9991

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JU CHAN CORP.

CEO's Message



Thank you very much for your attention to our company and the products.
We JU CHAN CORP. have been manufacturing a broad range of flanges from forged steel material and supply to the world base customers since 1992.

In addition we've participated in many projects of refinery and chemical plants, oil & gas, offshore & shipbuilding and we have supplied not only the standard products such as ANSI, JIS, MSS, DIN, and AWWA, but also the non-standard flanges like forged neck, nozzle type flanges and tube sheet etc.

Quality is our best priority and we have accumulated many intangible know-how in field of oil and gas pipeline, boiler, heat exchanger, pressure vessel, ship building, power plant, chemical plant.

We are sure that we will continue to make our best efforts so that we can supply high quality products at reasonable prices and prompt, dedicated responses to our customers.

KU HO. SHIN
C.E.O

JU CHAN CORP.

Certificate













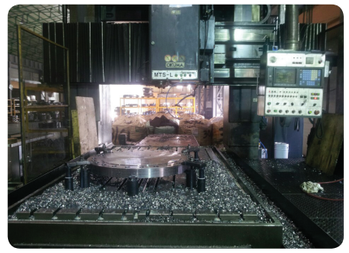
Production Facilities & Equipment

Equipment	Description	Maker	Q'ty
Turning Machine	ø3,000 × 2,000	Japan	1
Turning Machine	ø1,800 × 2,000	Japan	1
Turning Machine	ø1,200 × 1,600	Japan	1
NC Turning Machine	ø1,800 × 2,000	Japan	1
Plano Miller	X3000-Y1650-Z1300	Japan	1
Lathe	ø900 × 3,000L	Korea	1
Lathe	ø580 × 1,000L	Korea	1
Lathe	ø400 × 1,060L	Korea	1
Lathe	ø720 × 3000L	Korea	1
Horizontal Lathe	ø630 × 1,000L	Korea	1
Radial	ø2000	Korea	1
Radial	ø2000	Japan	1
Vertical Drill	ø560	Korea	1
Portable Drill	ø21	Korea	1
	ø13	Korea	1
PLASMA	8.7KW	Korea	1
Welder	12KW	Korea	1
	10KW	Korea	1
	200A	Korea	1
Compressor	5HP	Korea	1
Hoist Crane	10Ton	Korea	1
	5Ton	Korea	2
Marking Machine	MCU-100N	Korea	1
	Own Customize	Korea	1
Lapping Machine	Own Customize	Korea	



Major Products

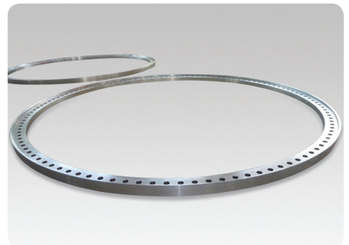
Processing Facilities







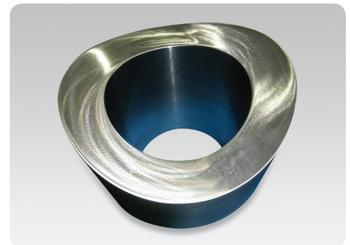

Production Goods



TOWER FLANGE



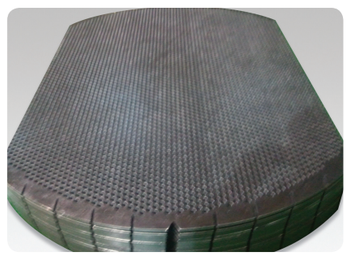
NOZZLE FLANGE



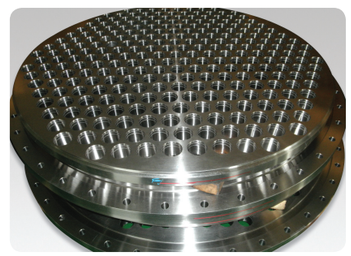
BOSS



FLANGEOLET



BAFFLE



TUBE SHEET





Facility

Universal Testing Machine



Positive Material Identificaion



Ultrasonic Tester



Hardness Tester



Spectro Tester



Surface Roughness Tester



FLANGE LIST

ASME B16.5

ASME B16.5 FLANGES

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CLASS 2500 24

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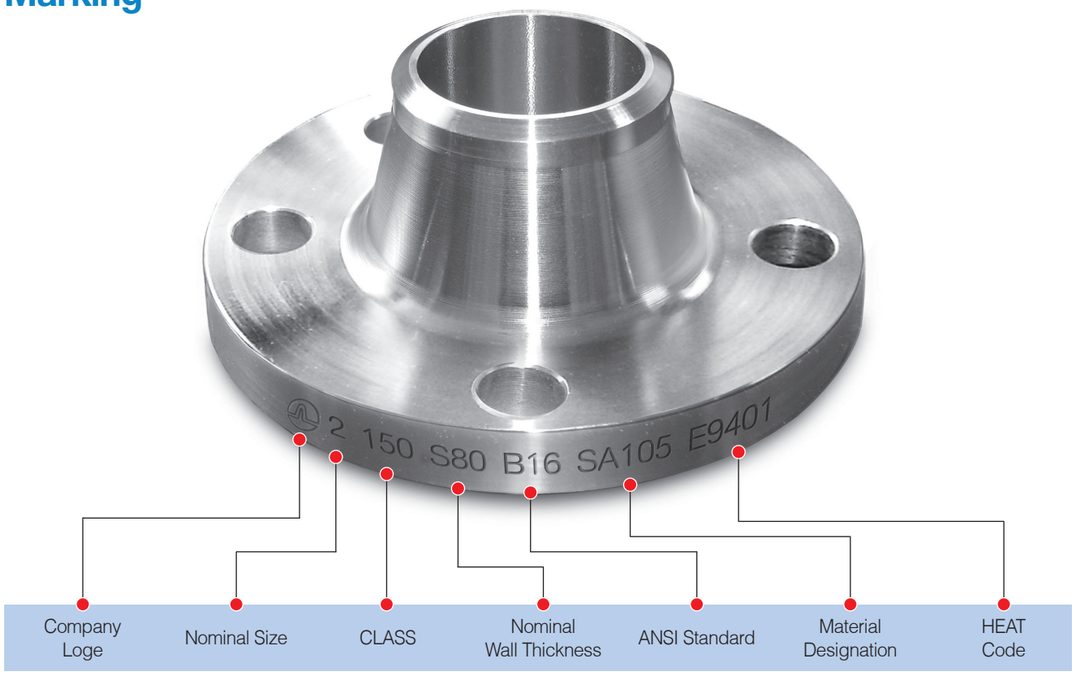
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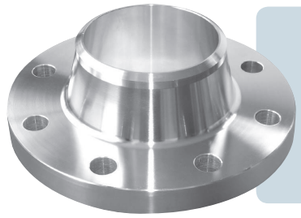
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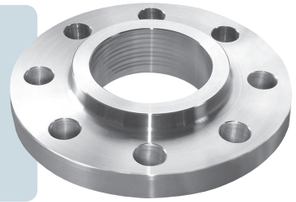


Welding Neck Flanges

The welding neck flange is normally referred to as the “high hup” flange. It is designed to transfer stresses to the pipe, thereby reducing high stress concentrations at the base of the flange. The welding neck flanges is the best designed buttwelded flange of those currently available because of its inherent structural value. It is expensive because of the design.

Threaded(Screwed) Flanges

The threaded flange is similar to the slip-on flange, but the bore is threaded. Its chief merit is that it can be assembled without welding, explaning its use in low pressure services at ordinary atmospheric temperatures, and in highly explosive areas where welding create a hazard.





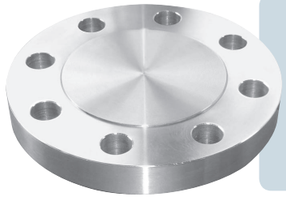
Slip-on Flanges

The Slip-on flanges has a low hub because the pipe slips into the flange prior to welding. It is welded both inside and out to provide sufficient strength and prevent leakage. Slip-on flanges are all bored slightly larger than the O.D. of the matching pipe They are preferred over welding neck flanges by many users due to their lower inital cost, but final installation cost is probably not much less than that of the welding neck flange because of the additional welding involved.

Lap joint Flanges

The lap joint flange is practically identical to a slip-on flange except it has a radius at the intersection of the bore and flange face. This radius is necessary to have the flange accommodate a lap joint stub end.
Normally, a lap joint flange and a lap joint stub end are mated together in an assembly system.





Blind Flanges

The blind flanges is a flange without a bore. It is used to close off the ends of a piping system and/or pressure vessel opening. It also permits easy access to the interior of a line or vessel once it has been sealed and must be reopened.

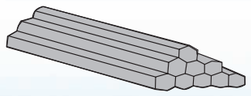
Socket Welding Flanges

The socket welding flange is similar to a slip-on flange except it has a bore and a counterbore dimension. The counterbore is slightly larger than the O.D. of the matching pipe, allowing the pipe to be inserted into the flange similar to a slip-on flange. The diameter of the smaller bore is the same as the I.D. of the matching pipe A restriction is built into the bottom of the bore which sets as a shoulder for the pipe to rest on. This eliminates any restriction in flow when using a socket welding flange.



MANUFACTURING PROCESS FOR FLANGES

Raw Material



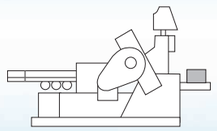
- Raw Material Check
- Quantity Check
- Visual & Dimension Check

Material Analyzing



- Chemical Analysis Check
- Preservation of Analysis Certificate

Material Cutting



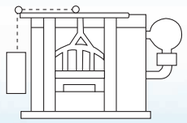
- Weight Measuring
- Cut Surface Check
- Marking

Forging



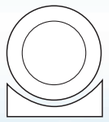
- Material Grade Check
- Weight Measuring
- Temperature Control
- Mechanical Test

Machining



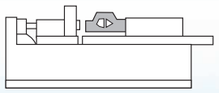
- Material Grade Check
- Weight Measuring
- Temperature Control
- Dimension Check

Inspection



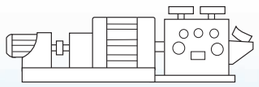
- Dimension Test
- Visual Test
- Nondestructive Test

Marking



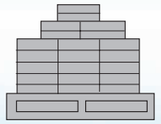
- Description Marking
- Size Marking
- Lot No. Marking

Under Coating



- Preserve Check
- Tectyl 506 or etc. Coating

Packing



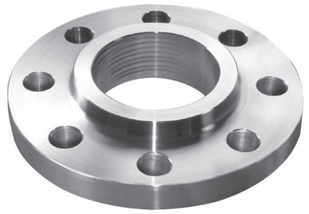
- Packing Spec. Check
- Packing Inspection

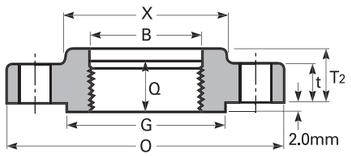
ASME B16.5-2003

ASME B16.5 FLANGES

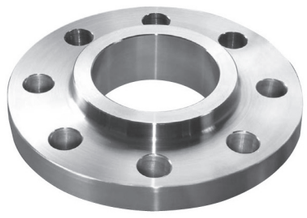


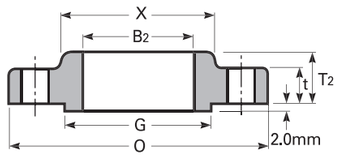
CLASS 150 FLANGES



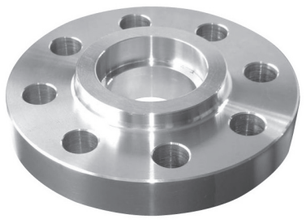


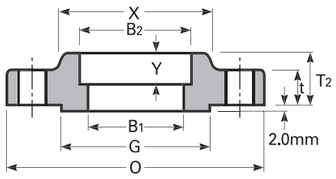
THREADED





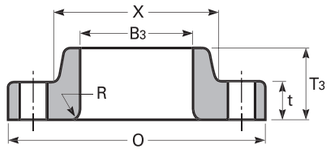
SLIP-ON



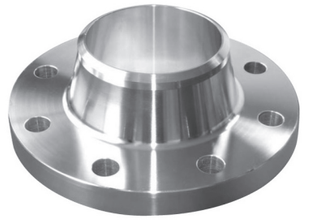


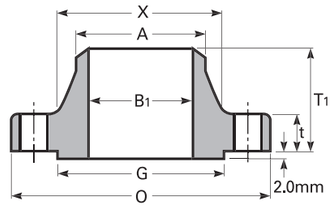
SOCKET WELDING





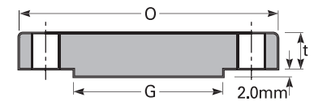
LAP JOINT





WELDING NECK





BLIND

ASME B16.5-2003ED FORGED FLANGES

Unit : mm

Size	Outside Diam.	Thick-ness	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE			Ridius of Fillet	Depth of Socket
						Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Slip-On/ Socket-Welding	Lap Joint		
	O	t	X	G	A	T1	T2	T3	Q	B1	B2	B3	R	Y
1/2	90	9.6	30	35.1	21.3	46	14	16	16	15.8	22.2	22.9	3	10
3/4	100	11.2	38	42.9	26.7	51	14	16	16	20.9	27.7	28.2	3	11
1	110	12.7	49	50.8	33.4	54	16	17	17	26.6	34.5	34.9	3	13
1 1/4	115	14.3	59	63.5	42.2	56	19	21	21	35.1	43.2	43.7	5	14
1 1/2	125	15.9	65	73.2	48.3	60	21	22	22	40.9	49.5	50.0	6	16
2	150	17.5	78	91.9	60.3	62	24	25	25	52.5	61.9	62.5	8	17
2 1/2	180	20.7	90	104.6	73.0	68	27	29	29	62.7	74.6	75.4	8	19
3	190	22.3	108	127.0	88.9	68	29	30	30	77.9	90.7	91.4	10	21
3 1/2	215	22.3	122	139.7	101.6	70	30	32	32	90.1	103.4	104.1	10	22.4
4	230	22.3	135	157.2	114.3	75	32	33	33	102.3	116.1	116.8	11	24.1
5	255	22.3	164	185.7	141.3	87	35	36	36	128.2	143.8	144.4	11	23.9
6	280	23.9	192	215.9	168.3	87	38	40	40	154.1	170.7	171.4	13	26.9
8	345	27.0	246	269.7	219.1	100	43	44	44	202.7	221.5	222.2	13	31.8
10	405	28.6	305	323.9	273.0	100	48	49	49	254.6	276.2	277.4	13	33.3
12	485	30.2	365	381.0	323.8	113	54	56	56	304.8	327.0	328.2	13	39.6
14	535	33.4	400	412.8	355.6	125	56	79	57	To be Specified by Purchaser	359.2	360.2	13	41.4
16	595	35.0	457	469.9	406.4	125	62	87	64		410.5	411.2	13	44.5
18	635	38.1	505	533.4	457.0	138	67	97	68		461.8	462.3	13	49.3
20	700	41.3	559	584.2	508.0	143	71	103	73		513.1	514.4	13	54.1
24	815	46.1	663	692.2	610.0	151	81	111	83		616.0	616.0	13	63.5

Notes :

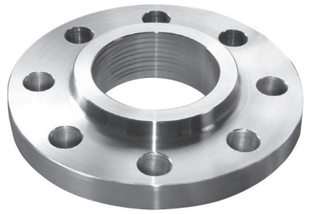
(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a fl at face. The flat face may be either the full t dimension of thickness plus 2 mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socketwelding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back face of the flange.

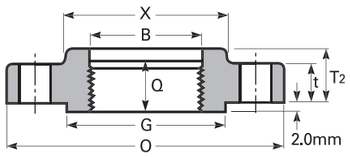
Unit : mm

Size	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)				
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolt (inch)	Machine Bolt Length (Raised Face)	Stud Bolt Length		Welding Neck	Slip-On/ Threaded	Lap Joint	Blind	Socket Welding
						2mm Raised Face	Ring Joint					
1/2	60.3	4	15.9	1/2	50	55	-	0.51	0.47	0.51	0.47	0.47
3/4	69.9	4	15.9	1/2	50	65	-	0.73	0.58	0.64	0.63	0.59
1	79.4	4	15.9	1/2	55	65	75	1.07	0.86	0.93	0.94	0.87
1 1/4	88.9	4	15.9	1/2	55	70	85	1.40	1.08	1.16	1.23	1.11
1 1/2	98.4	4	15.9	1/2	65	70	85	1.81	1.41	1.51	1.62	1.45
2	120.7	4	19.1	5/8	70	85	95	2.59	2.26	2.38	2.64	2.33
2 1/2	139.7	4	19.1	5/8	75	90	100	4.28	3.43	3.60	4.06	3.55
3	152.4	4	19.1	5/8	75	90	100	5.18	3.87	4.04	4.90	4.02
3 1/2	177.8	8	19.1	5/8	75	90	100	5.45	4.99	4.99	5.90	4.99
4	190.5	8	19.1	5/8	75	90	100	7.32	5.75	5.96	7.41	5.99
5	215.9	8	22.2	3/4	85	95	110	8.91	6.22	6.44	8.76	6.68
6	241.3	8	22.2	3/4	85	100	115	11.26	7.38	7.59	11.31	7.99
8	298.5	8	22.2	3/4	90	110	120	17.68	12.36	12.66	19.92	13.29
10	362.0	12	25.4	7/8	100	115	125	24.79	17.10	16.78	29.39	19.50
12	431.8	12	25.4	7/8	100	120	135	38.98	27.68	28.30	43.70	29.03
14	476.3	12	28.6	1	115	135	145	51.71	35.20	41.50	59.42	38.56
16	539.8	16	28.6	1	115	135	145	64.41	42.18	52.98	77.11	44.49
18	577.9	16	31.8	1 1/8	125	145	160	74.84	49.71	59.00	94.80	54.43
20	635.0	20	31.8	1 1/8	140	160	170	89.36	65.50	72.12	123.38	70.31
24	749.3	20	34.9	1 1/4	150	170	185	119.66	90.50	99.02	188.24	95.25

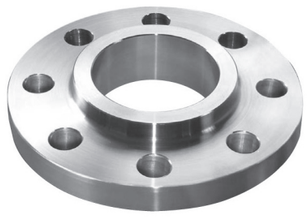
(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard Wall pipe. Thickness of Standard Wall is the same as Schedule 40 in sizes NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the purchaser.
(f) Depth of Socket(Y) is covered by ASME B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.

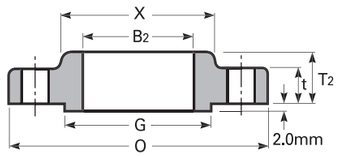
CLASS 300 FLANGES



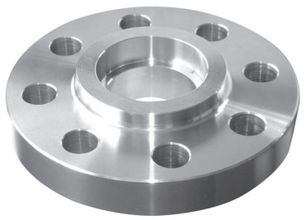


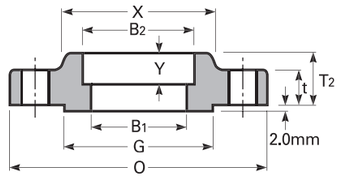
THREADED





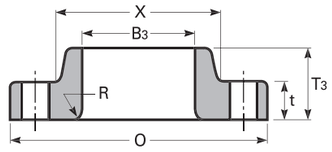
SLIP-ON



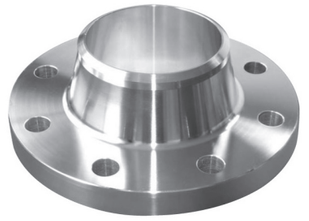


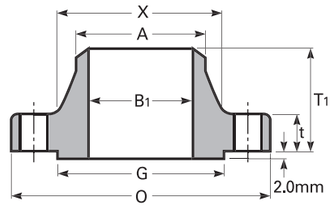
SOCKET WELDING





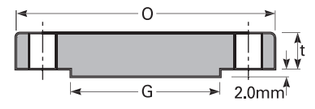
LAP JOINT





WELDING NECK





BLIND

ASME B16.5-2003ED FORGED FLANGES

Unit : mm

Nominal Pipe Size	Outside Diam.	Thick-ness	Thick-ness Lap Joint	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE			
							Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Slip-On/ Socket-Welding	Lap Joint	Counter Bore Min. Threaded
	O	t	t	X	G	A	T1	T2	T3	Q	B1	B2	B3	B
1/2	95	12.7	14.3	38	35.1	21.3	51	21	22	16	15.8	22.2	22.9	23.6
3/4	115	14.3	15.9	48	42.9	26.7	56	24	25	16	20.9	27.7	28.2	29.0
1	125	15.9	17.5	54	50.8	33.4	60	25	27	18	26.6	34.5	34.9	35.8
1 1/4	135	17.5	19.1	64	63.5	42.2	64	25	27	21	35.1	43.2	43.7	44.4
1 1/2	155	19.1	20.7	70	73.2	48.3	67	29	30	23	40.9	49.5	50.0	50.3
2	165	20.7	22.3	84	91.9	60.3	68	32	33	29	52.5	61.9	62.5	63.5
2 1/2	190	23.9	25.4	100	104.6	73.0	75	37	38	32	62.7	74.6	75.4	76.2
3	210	27.0	28.6	117	127.0	88.9	78	41	43	32	77.9	90.7	91.4	92.2
3 1/2	230	28.6	30.2	133	139.7	101.6	79	43	44	37	90.1	103.4	104.1	104.9
4	255	30.2	31.8	146	157.2	114.3	84	46	48	37	102.3	116.1	116.8	117.6
5	280	33.4	35.0	178	185.7	141.3	97	49	51	43	128.2	143.8	144.4	144.4
6	320	35.0	36.6	206	215.9	168.3	97	51	52	47	154.1	170.7	171.4	171.4
8	380	39.7	41.3	260	269.7	219.1	110	60	62	51	202.7	221.5	222.2	222.2
10	445	46.1	47.7	321	323.9	273.0	116	65	95	56	254.6	276.2	277.4	276.2
12	520	49.3	50.8	375	381.0	323.8	129	71	102	61	304.8	327.0	328.2	328.6
14	585	52.4	54.0	425	412.8	355.6	141	75	111	64	To be Specified by Purchaser	359.2	360.2	360.4
16	650	55.6	57.2	483	469.9	406.4	144	81	121	69		410.5	411.2	411.2
18	710	58.8	60.4	533	533.4	457.0	157	87	130	70		461.8	462.3	462.0
20	775	62.0	63.5	587	584.2	508.0	160	94	140	74		513.1	514.4	512.8
24	915	68.3	69.9	702	692.2	610.0	167	105	152	83		616.0	616.0	614.4

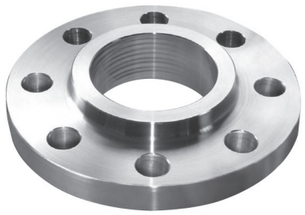
Unit : mm

Nominal Pipe Size	Ridius of Fillet	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)				
			Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolt (inch)	Machine Bolt Length (Raised Face)	Stud Bolt Length		Welding Neck	Slip-On/ Threaded	Lap Joint	Blind	Socket Welding
								2mm Raised Face	Ring Joint					
	R	Y												
1/2	3	10	66.7	4	15.9	1/2	55	65	75	0.78	0.62	0.61	0.62	0.62
3/4	3	11	82.6	4	19.1	5/8	65	75	90	1.34	1.15	1.15	1.16	1.19
1	3	13	88.9	4	19.1	5/8	65	75	90	1.64	1.39	1.38	1.42	1.44
1 1/4	5	14	98.4	4	19.1	5/8	70	85	95	2.06	1.67	1.66	1.79	1.73
1 1/2	6	16	114.3	4	22.2	3/4	75	90	100	3.06	2.53	2.52	2.68	2.62
2	8	17	127.0	8	19.1	5/8	75	90	100	3.40	2.80	2.79	3.09	2.94
2 1/2	8	19	149.2	8	22.2	3/4	85	100	115	5.31	4.25	4.22	4.75	4.49
3	10	21	168.3	8	22.2	3/4	90	110	120	7.32	5.81	5.78	6.79	6.20
3 1/2	10	22.4	184.2	8	22.2	3/4	95	110	125	8.17	7.72	7.72	9.53	-
4	11	23.9	200.0	8	22.2	3/4	95	115	125	11.30	10.13	10.07	12.00	-
5	11	23.9	235.0	8	22.2	3/4	110	120	135	15.12	12.58	12.52	15.96	-
6	13	26.9	269.9	12	22.2	3/4	110	120	140	19.68	16.04	15.95	21.20	-
8	13	31.8	330.2	12	25.4	7/8	120	140	150	30.48	24.50	24.37	34.60	-
10	13	33.3	387.4	16	28.6	1	140	160	170	43.74	34.16	39.92	55.34	-
12	13	39.6	450.8	16	31.8	1 1/8	145	170	185	64.41	51.26	58.70	78.90	-
14	13	41.4	514.4	20	31.8	1 1/8	160	180	190	88.30	72.12	83.46	107.05	-
16	13	44.5	571.5	20	34.9	1 1/4	165	190	205	112.94	90.40	106.14	139.25	-
18	13	49.3	628.6	24	34.9	1 1/4	170	195	210	138.34	109.00	133.95	176.90	-
20	13	54.1	685.8	24	34.9	1 1/4	185	205	220	167.37	136.00	157.65	223.17	-
24	13	63.5	812.8	24	41.3	1 1/2	205	230	255	235.41	204.00	240.40	342.00	-

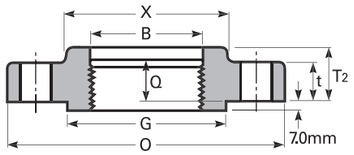
Notes :

(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a flat face. The flat face may be either the full t dimension of thickness plus 2 mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back face of the flange.
(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard Wall pipe. Thickness of Standard Wall is the same as Schedule 40 in sizes NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the purchaser.
(f) Depth of Socket(Y) is covered by ASME B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.

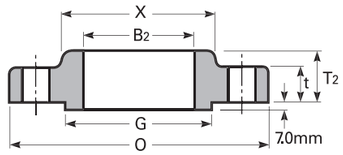
CLASS 400 FLANGES





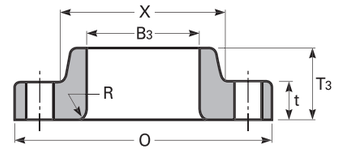


THREADED

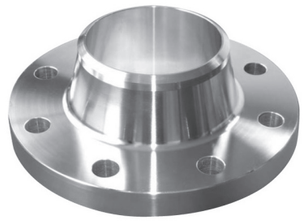


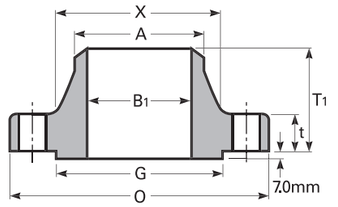
SLIP-ON



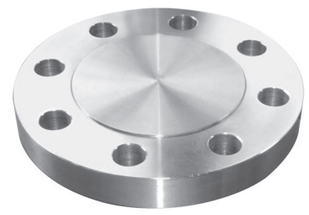


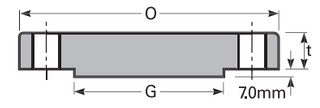
LAP JOINT





WELDING NECK





BLIND

ASME B16.5-2003ED

Unit : mm

Nominal Pipe Size	Outside Diam.	Thick-ness	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE			
						Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Slip-On/ Socket-Welding	Lap Joint	Counter Bore Min. Threaded
	O	t	X	G	A	T1	T2	T3	Q	B1	B2	B3	B
1/2	95	14.3	38	35.1	21.3	52	22	22	16	To be Specified by Purchaser.	22.2	22.9	23.6
3/4	115	15.9	48	42.9	26.7	57	25	25	16		27.7	28.2	29.0
1	125	17.5	54	50.8	33.4	62	27	27	18		34.5	34.9	35.8
1 1/4	135	20.7	64	63.5	42.2	67	29	29	21		43.2	43.7	44.4
1 1/2	155	22.3	70	73.2	48.3	70	32	32	23		49.5	50.0	50.6
2	165	25.4	84	91.9	60.3	73	37	37	29		61.9	62.5	63.5
2 1/2	190	28.6	100	104.6	73.0	79	41	41	32		74.6	75.4	76.2
3	210	31.8	117	127.0	88.9	83	46	46	35		90.7	91.4	92.2
3 1/2	230	35.0	133	139.7	101.6	86	49	49	40		103.4	104.1	104.9
4	255	35.0	146	157.2	114.3	89	51	51	37		116.1	116.8	117.6
5	280	38.1	178	185.7	141.3	102	54	54	43		143.8	144.5	144.4
6	320	41.3	206	215.9	168.3	103	57	57	46		170.7	171.4	171.4
8	380	47.7	260	269.7	219.1	117	68	68	51		221.5	222.2	222.2
10	445	54.0	321	323.9	273.0	124	73	102	56		276.2	277.4	276.2
12	520	57.2	375	381.0	323.8	137	79	108	61		327.0	328.2	328.6
14	585	60.4	425	412.8	355.6	149	84	117	64		359.2	360.2	360.4
16	650	63.5	483	469.9	406.4	152	94	127	69		410.5	411.2	411.2
18	710	66.7	533	533.4	457.0	165	98	137	70		461.8	462.3	462.0
20	775	69.9	587	584.2	508.0	168	102	146	74		513.1	514.4	512.8
24	915	76.2	702	692.2	610.0	175	114	159	83		616.0	616.0	614.4

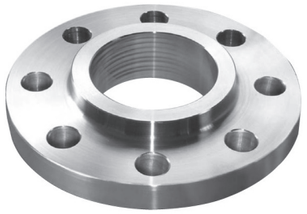
Unit : mm

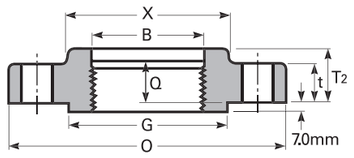
Nominal Pipe Size	Ridius of Fillet	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)			
		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolt (inch)	Stud Bolt Length			Welding Neck	Slip-On/ Threaded	Lap Joint	Blind
						Male-Female Tongue-Groove	7mm Raised Face	Ring Joint				
	R											
1/2	3	66.7	4	15.9	1/2	70	75	75	1.36	0.91	0.80	0.91
3/4	3	82.6	4	19.1	5/8	85	90	90	1.59	1.36	1.36	1.40
1	3	88.9	4	19.1	5/8	85	90	90	1.81	1.59	1.59	1.70
1 1/4	5	98.4	4	19.1	5/8	90	95	95	2.50	2.10	2.04	2.27
1 1/2	6	114.3	4	22.2	3/4	100	110	110	3.63	3.10	2.95	3.40
2	8	127.0	8	19.1	5/8	100	110	110	4.54	3.63	3.63	4.40
2 1/2	8	149.2	8	22.2	3/4	115	120	120	6.35	5.44	4.99	6.80
3	10	168.3	8	22.2	3/4	120	125	125	8.17	7.26	6.35	8.90
3 1/2	10	184.2	8	25.4	7/8	135	140	140	11.80	9.53	9.08	13.17
4	11	200.0	8	25.4	7/8	135	140	140	13.61	10.89	9.98	14.40
5	11	235.0	8	25.4	7/8	135	145	145	17.69	14.07	13.15	19.50
6	13	269.9	12	25.4	7/8	145	150	150	22.23	19.98	16.78	27.67
8	13	330.0	12	28.4	1	165	170	170	35.38	30.40	26.16	45.36
10	13	387.4	16	31.8	1 1/8	185	190	190	49.89	41.28	43.09	68.00
12	13	450.8	16	35.1	1 1/4	195	205	205	72.57	59.02	68.95	98.00
14	13	514.4	20	35.1	1 1/4	205	210	210	105.69	81.72	95.25	131.66
16	13	571.5	20	38.1	1 3/8	215	220	220	133.30	106.69	127.00	167.00
18	13	628.6	24	38.1	1 3/8	220	230	230	158.90	129.39	156.49	206.57
20	13	685.8	24	41.1	1 1/2	235	240	250	193.00	152.00	190.51	261.00
24	13	812.8	24	47.8	1 3/4	260	265	280	281.48	231.54	278.96	395.00

Notes :

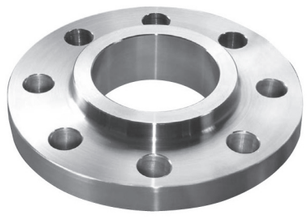
(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a flat face. The flat face may be either the full t dimension of thickness plus 7mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socketwelding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back face of the flange.
(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard Wall pipe. Thickness of Standard Wall is the same as Schedule 40 in sizes NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the purchaser.
(f) Dimensions of sizes 1/2" through 3 1/2" are the same as for Class 600 flanges.

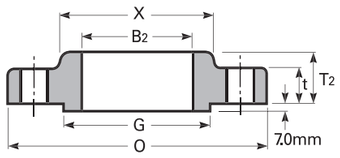
CLASS 600 FLANGES



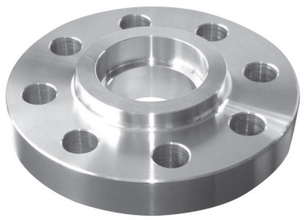


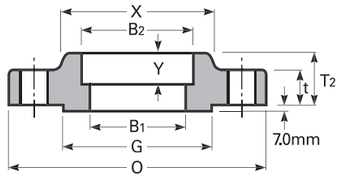
THREADED





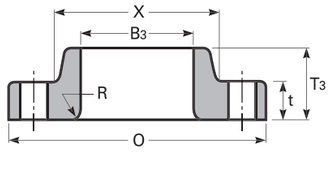
SLIP-ON



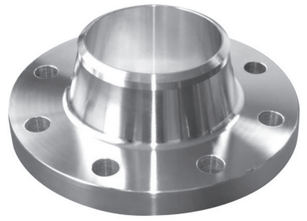


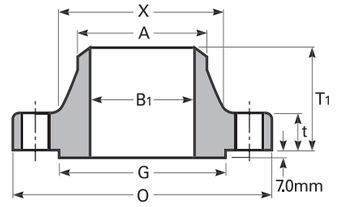
SOCKET WELDING





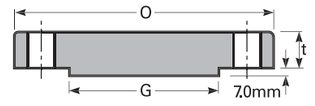
LAP JOINT





WELDING NECK





BLIND

ASME B16.5-2003ED

Unit : mm

Nominal Pipe Size	Outside Diam.	Thick-ness	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE			
						Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Slip-On/ Socket-Welding	Lap Joint	Counter Bore Min. Threaded
	O	t	X	G	A	T1	T2	T3	Q	B1	B2	B3	B
1/2	95	14.3	38	35.1	21.3	52	22	22	16	To be Specified by Purchaser.	22.2	22.9	23.6
3/4	115	15.9	48	42.9	26.7	57	25	25	16		27.7	28.2	29.0
1	125	17.5	54	50.8	33.4	62	27	27	18		34.5	34.9	35.8
1 1/4	135	20.7	64	63.5	42.2	67	29	29	21		43.2	43.7	44.4
1 1/2	155	22.3	70	73.2	48.3	70	32	32	23		49.5	50.0	50.6
2	165	25.4	84	91.9	60.3	73	37	37	29		61.9	62.5	63.5
2 1/2	190	28.6	100	104.6	73.0	79	41	41	32		74.6	75.4	76.2
3	210	31.8	117	127.0	88.9	83	46	46	35		90.7	91.4	92.2
3 1/2	230	35.0	133	139.7	101.6	86	49	49	40		103.4	104.1	104.9
4	275	38.1	152	157.2	114.3	102	54	54	42		116.1	116.8	117.6
5	330	44.5	189	185.7	141.3	114	60	60	48		143.8	144.4	144.4
6	355	47.7	222	215.9	168.3	117	67	67	51		170.7	171.4	171.4
8	420	55.6	273	269.7	219.1	133	76	76	58		221.5	222.2	222.2
10	510	63.5	343	323.9	273.0	152	86	111	66		276.2	277.4	276.2
12	560	66.7	400	381.0	323.8	156	92	117	70		327.0	328.2	328.6
14	605	69.9	432	412.8	355.6	165	94	127	74		359.2	360.2	360.4
16	685	76.2	495	469.9	406.4	178	106	140	78		410.5	411.2	411.2
18	745	82.6	546	533.4	457.0	184	117	152	80		461.8	462.3	462.0
20	815	88.9	610	584.2	508.0	190	127	165	83		513.1	514.4	512.8
24	940	101.6	718	692.2	610.0	203	140	184	93		616.0	616.0	614.4

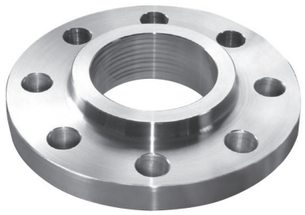
Unit : mm

Nominal Pipe Size	Ridius of Fillet	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)				
			Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolt (inch)	Stud Bolt Length			Welding Neck	Slip-On/ Threaded	Lap Joint	Blind	Socket Welding
							Male-Female Tongue-Groove	7mm Raised Face	Ring Joint					
	R	Y												
1/2	3	10	66.7	4	15.9	1/2	70	75	75	0.90	0.91	0.80	0.91	0.91
3/4	3	11	82.6	4	19.1	5/8	85	90	90	1.59	1.40	1.36	1.40	1.36
1	3	13	88.9	4	19.1	5/8	85	90	90	1.90	1.70	1.59	1.81	1.81
1 1/4	5	14	98.4	4	19.1	5/8	90	95	95	2.49	2.27	2.04	2.40	2.60
1 1/2	6	16	114.3	4	22.2	3/4	100	110	110	3.63	3.10	2.95	3.40	3.18
2	8	17	127.0	8	19.1	5/8	100	110	110	4.54	3.63	3.63	4.40	3.90
2 1/2	8	19	149.2	8	22.2	3/4	115	120	120	6.35	5.44	4.99	6.80	5.90
3	10	21	168.3	8	22.2	3/4	120	125	125	8.16	7.26	6.35	8.90	7.40
3 1/2	10	22.4	184.2	8	25.4	7/8	135	140	140	11.80	9.53	9.08	13.17	-
4	11	23.9	215.9	8	25.4	7/8	140	145	145	16.78	14.97	14.06	18.60	-
5	11	23.9	266.7	8	28.6	1	160	165	165	30.87	28.50	27.50	30.84	-
6	13	26.9	292.1	12	28.6	1	165	170	170	36.77	36.32	35.38	38.00	-
8	13	31.8	349.2	12	31.8	1 1/8	185	190	195	50.80	44.00	50.80	62.20	-
10	13	33.3	431.8	16	34.9	1 1/4	210	215	215	86.26	76.20	74.00	102.00	-
12	13	39.6	489.0	20	34.9	1 1/4	215	220	220	102.51	97.52	108.86	132.00	-
14	13	41.4	527.0	20	38.1	1 3/8	230	235	235	121.56	102.00	111.00	158.00	-
16	13	44.5	603.2	20	41.3	1 1/2	250	255	255	177.06	149.82	165.71	224.73	-
18	13	49.3	654.0	20	44.5	1 5/8	265	275	275	215.65	180.10	194.00	285.00	-
20	13	54.1	723.9	24	44.5	1 5/8	280	285	290	267.86	231.54	258.78	365.00	-
24	13	63.5	838.2	24	50.8	1 7/8	325	330	335	372.00	330.00	362.00	533.45	-

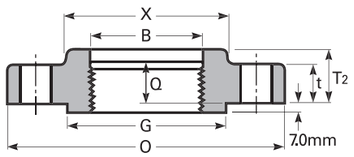
Notes :

(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a fl at face. The flat face may be either the full t dimension of thickness plus 7mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back face of the flange.
(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard Wall pipe. Thickness of Standard Wall is the same as Schedule 40 in sizes NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the purchaser.
(f) Depth of Socket(Y) is covered by ASME B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.

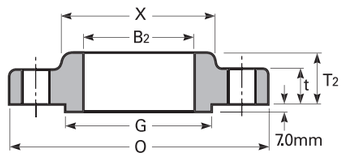
CLASS 900 FLANGES





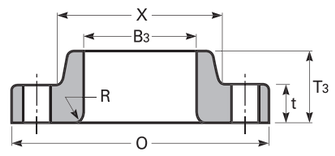


THREADED

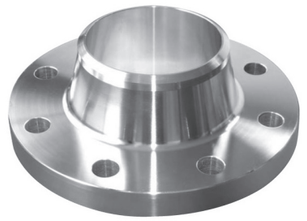


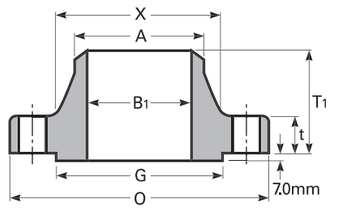
SLIP-ON





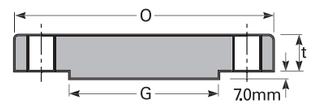
LAP JOINT





WELDING NECK





BLIND

ASME B16.5-2003ED

Unit : mm

Nominal Pipe Size	Outside Diam.	Thick-ness	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE			
						Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Slip-On/ Socket-Welding	Lap Joint	Counter Bore Min. Threaded
	O	t	X	G	A	T1	T2	T3	Q	B1	B2	B3	B
1/2	120	22.3	38	35.1	21.3	60.0	32.0	32.0	23.0	To be Specified by Purchaser.	22.2	22.9	23.6
3/4	130	25.4	44	42.9	26.7	70.0	35.0	35.0	26.0		27.7	28.2	29.0
1	150	28.6	52	50.8	33.4	73.0	41.0	41.0	29.0		34.5	34.9	35.8
1 1/4	160	28.6	64	63.5	42.2	73.0	41.0	41.0	31.0		43.2	43.7	44.4
1 1/2	180	31.8	70	73.2	48.3	83.0	44.0	44.0	32.0		49.5	50.0	50.6
2	215	38.1	105	91.9	60.3	102.0	57.0	57.0	39.0		61.9	62.5	63.5
2 1/2	245	41.3	124	104.6	73.0	105.0	64.0	64.0	48.0		74.6	75.4	76.2
3	240	38.1	127	127.0	88.9	102.0	54.0	54.0	42.0		90.7	91.4	92.2
4	290	44.5	159	157.2	114.3	114.0	70.0	70.0	48.0		116.1	116.8	117.6
5	350	50.8	190	185.7	141.3	127.0	79.0	79.0	54.0		143.8	144.4	144.4
6	380	55.6	235	215.9	168.3	140.0	86.0	86.0	58.0		170.7	171.4	171.4
8	470	63.5	298	269.7	219.1	162.0	102.0	114.0	64.0		221.5	222.2	222.2
10	545	69.9	368	323.9	273.0	184.0	108.0	127.0	72.0		276.2	277.4	276.2
12	610	79.4	419	381.0	323.8	200.0	117.0	143.0	77.0		327.0	328.2	328.6
14	640	85.8	451	412.8	355.6	213.0	130.0	156.0	83.0		359.2	360.2	360.4
16	705	88.9	508	469.9	406.4	216.0	133.0	165.0	86.0		410.5	411.2	411.2
18	785	101.6	565	533.4	457.0	229.0	152.0	190.0	89.0		461.8	462.3	462.0
20	855	108.0	622	584.2	508.0	248.0	159.0	210.0	93.0		513.1	514.4	512.8
24	1040	139.7	749	692.2	610.0	292.0	203.0	267.0	102.0		616.0	616.0	614.4

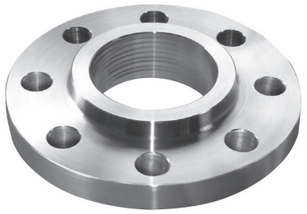
Unit : mm

Nominal Pipe Size	Ridius of Fillet	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)			
		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolt (inch)	Stud Bolt Length			Welding Neck	Slip-On/ Threaded	Lap Joint	Blind
						Male-Female Tongue-Groove	7mm Raised Face	Ring Joint				
	R											
1/2	3	82.6	4	22.2	3/4	100	110	110	2.10	1.81	1.81	1.90
3/4	3	88.9	4	22.2	3/4	110	115	115	2.72	2.40	2.30	2.70
1	3	101.6	4	25.4	7/8	120	125	125	3.86	3.41	3.40	4.09
1 1/4	5	111.1	4	25.4	7/8	120	125	125	4.54	4.10	4.09	4.54
1 1/2	6	123.8	4	28.6	1	135	140	140	5.90	5.45	5.40	5.90
2	8	165.1	8	25.4	7/8	140	145	145	10.89	9.98	9.53	11.34
2 1/2	8	190.5	8	28.6	1	150	160	160	16.33	15.80	13.15	16.00
3	10	190.5	8	25.4	7/8	140	145	145	15.00	11.80	11.34	13.17
4	11	235.0	8	31.8	1 1/8	165	170	170	23.13	23.20	22.60	24.50
5	11	279.4	8	34.9	1 1/4	185	190	190	38.50	37.65	36.74	39.46
6	13	317.5	12	31.8	1 1/8	185	190	195	49.89	48.30	47.50	51.50
8	13	393.7	12	38.1	1 3/8	215	220	220	79.45	75.00	86.00	89.00
10	13	469.9	16	38.1	1 3/8	230	235	235	118.04	111.13	125.64	131.54
12	13	533.4	20	38.1	1 3/8	250	255	255	157.00	146.00	167.00	187.00
14	13	558.8	20	41.3	1 1/2	265	275	280	181.60	172.36	180.07	224.07
16	13	616.0	20	44.5	1 5/8	280	285	290	224.73	192.95	211.11	272.40
18	13	685.8	20	50.8	1 7/8	320	325	335	308.72	272.40	295.10	385.90
20	13	749.3	20	54.0	2	345	350	360	376.82	331.42	367.74	488.00
24	13	901.7	20	66.7	2 1/2	430	440	455	685.00	632.00	700.00	905.00

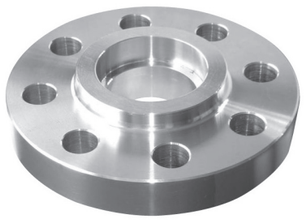
Notes :

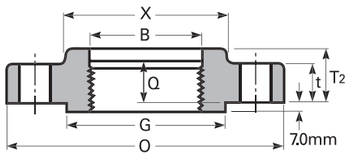
(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a fl at face. The flat face may be either the full t dimension of thickness plus 7mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socketwelding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back face of sdf the flange.
(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard.

CLASS 1500 FLANGES

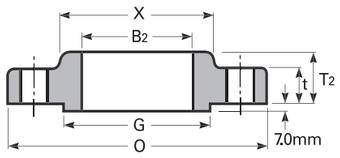




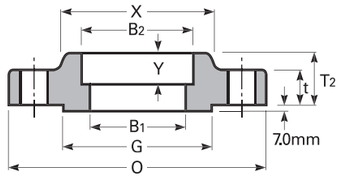




THREADED

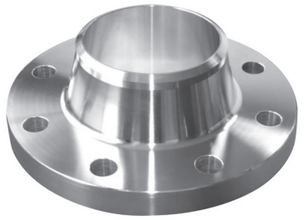


SLIP-ON

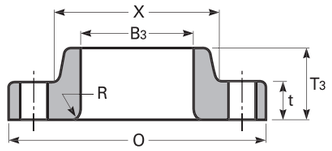


SOCKET WELDING

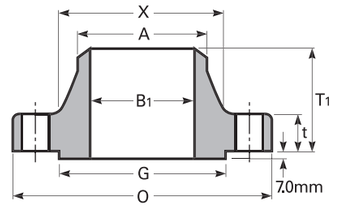




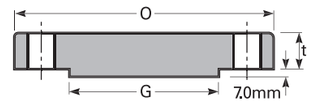




LAP JOINT



WELDING NECK



BLIND

ASME B16.5-2003ED

Unit : mm

Nominal Pipe Size	Outside Diam.	Thick-ness	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE			
						Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Slip-On/ Socket-Welding	Lap Joint	Counter Bore Min. Threaded
	O	t	X	G	A	T1	T2	T3	Q	B1	B2	B3	B
1/2	120	22.3	38	35.1	21.3	60	32	32	23	To be Specified by Purchaser.	22.2	22.9	23.6
3/4	130	25.4	44	42.9	26.7	70	35	35	26		27.7	28.2	29.0
1	150	28.6	52	50.8	33.4	73	41	41	29		34.5	34.9	35.8
1 1/4	160	28.6	64	63.5	42.2	73	41	41	31		43.2	43.7	44.4
1 1/2	180	31.8	70	73.2	48.3	83	44	44	32		49.5	50.0	50.6
2	215	38.1	105	91.9	60.3	102	57	57	39		61.9	62.5	63.5
2 1/2	245	41.3	124	104.6	73.0	105	64	64	48		74.6	75.4	76.2
3	265	47.7	133	127.0	88.9	117	73.2	73	50.8		90.7	91.4	92.2
4	310	54.0	162	157.2	114.3	124	90.4	90	57.2		116.1	116.8	117.6
5	375	73.1	197	185.7	141.3	156	104.6	105	57.2		143.8	144.4	144.5
6	395	82.6	229	215.9	168.3	171	119.1	119	69.9		170.7	171.4	171.5
8	485	92.1	292	269.7	219.1	213	142.7	143	76.2		221.5	222.2	222.3
10	585	108.0	368	323.9	273.0	254	158.8	178	84.1		276.4	277.4	276.4
12	675	123.9	451	381.0	323.8	283	180.8	219	91.9		327.2	328.2	328.7
14	750	133.4	495	412.8	355.6	298	-	241	-		359.2	360.2	360.4
16	825	146.1	552	469.9	406.4	311	-	260	-		410.5	411.2	411.2
18	915	162.0	597	533.4	457.0	327	-	276	-		461.8	462.3	462.0
20	985	177.8	641	584.2	508.0	356	-	292	-		513.1	514.4	512.8
24	1170	203.2	762	692.2	610.0	406	-	330	-		616.0	616.0	614.4

Notes :

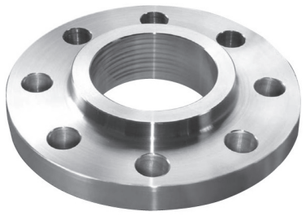
(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a flat face. The flat face may be either the full t dimension of thickness plus 7mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back face of the flange.

Unit : mm

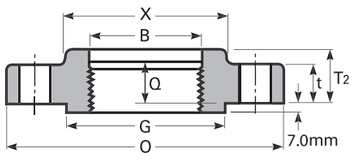
Nominal Pipe Size	Ridius of Fillet	Depth of Socket	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)				
			Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolt (inch)	Male and Female/ Tongue and Groove	Stud Bolt Length		Welding Neck	Slip-On/ Threaded	Lap Joint	Blind	Socket Welding
								7mm Raised Face	Ring Joint					
	R	Y												
1/2	3	10	82.6	4	22.2	3/4	100	110	110	2.10	1.80	1.80	1.90	1.81
3/4	3	11	88.9	4	22.2	3/4	110	115	115	2.72	2.27	2.27	2.72	2.81
1	3	13	101.6	4	25.4	7/8	120	125	125	3.86	3.40	3.40	4.08	3.61
1 1/4	5	14	111.1	4	25.4	7/8	120	125	125	4.54	4.10	4.09	4.30	4.99
1 1/2	6	16	123.8	4	28.6	1	135	140	140	5.90	5.45	5.40	5.90	6.76
2	8	17	165.1	8	25.4	7/8	140	145	145	10.89	10.50	9.53	11.30	10.89
2 1/2	8	19	190.5	8	28.6	1	150	160	160	16.34	15.80	13.15	16.00	16.34
3	10	20.6	203.2	8	31.8	1 1/8	170	180	180	21.79	21.77	17.24	21.79	-
4	11	23.9	241.3	8	34.9	1 1/4	190	195	195	31.30	31.00	29.00	33.11	-
5	11	23.9	292.1	8	41.3	1 1/2	240	250	250	59.02	58.80	54.00	60.00	-
6	13	26.9	317.5	12	38.1	1 3/8	255	260	265	74.91	74.00	62.00	75.00	-
8	13	31.8	393.7	12	44.5	1 5/8	285	290	325	123.83	117.73	129.73	136.98	-
10	13	33.3	482.6	12	50.8	1 7/8	330	335	345	205.93	197.49	220.19	229.97	-
12	13	39.6	571.5	16	54.0	2	370	375	385	306.00	264.00	286.02	316.00	-
14	13	41.4	635.0	16	60.3	2 1/4	400	405	425	416.00	-	404.06	421.00	-
16	13	44.5	704.8	16	66.7	2 1/2	440	445	470	567.50	-	522.10	559.00	-
18	13	49.3	774.7	16	73.0	2 3/4	490	495	525	736.00	-	669.65	761.00	-
20	13	54.1	831.8	16	79.4	3	535	540	565	929.00	-	805.85	967.00	-
24	13	63.5	990.6	16	92.1	3 1/2	610	615	650	1504.00	-	1285.55	1568.00	-

(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard Wall pipe. Thickness of Standard Wall is the same as Schedule 40 in sizes NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the purchaser.
(f) Depth of Socket(Y) is covered by ASME B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.
(g) Dimensions of sizes 1/2" through 2 1/2" are the same as for Class 900 flanges.
(h) Over 2 1/2 inch of Bore(B, B2) and Thread Length(Q) are at the manufacture's option.

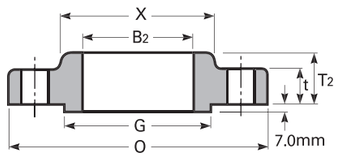
CLASS 2500 FLANGES





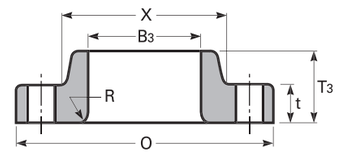


THREADED

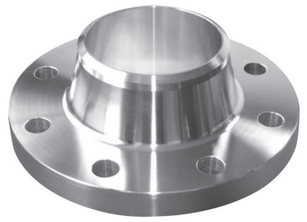


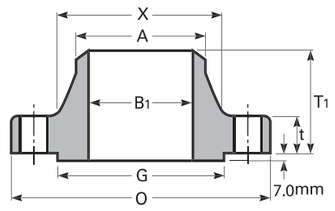
SLIP-ON



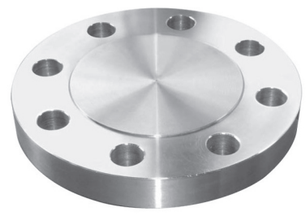


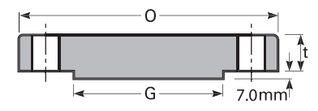
LAP JOINT





WELDING NECK





BLIND

ASME B16.5-2003ED

Unit : mm

Nominal Pipe Size	Outside Diam.	Thick-ness	Diam. of HUB	O.D of Raised Face	Diam. of Hub at Bavel	Length Through Hub			Thread Length	BORE		
						Welding Neck	Slip-On Threaded Socket Welding	Lap Joint		Welding Neck/ Socket Welding	Lap Joint	Counter Bore Min. Threaded
	O	t	X	G	A	T1	T2	T3	Q	B1	B3	B
1/2	135	30.2	43	35.1	21.3	73	40	40	29	To be Specified by Purchaser.	22.9	23.6
3/4	140	31.8	51	42.9	26.7	79	43	43	32		28.2	29.0
1	160	35.0	57	50.8	33.4	89	48	48	35		34.9	35.8
1 1/4	185	38.1	73	63.5	42.2	95	52	52	39		43.7	44.4
1 1/2	205	44.5	79	73.2	48.3	111	60	60	45		50.0	50.6
2	235	50.9	95	91.9	60.3	127	70	70	51		62.5	63.5
2 1/2	265	57.2	114	104.6	73.0	143	79	79	58		75.4	76.2
3	305	66.7	133	127.0	88.9	168	-	92	63.5		91.4	-
4	355	76.2	165	157.2	114.3	190	-	108	69.9		116.8	-
5	420	92.1	203	185.7	141.3	229	-	130	76.2		144.4	-
6	485	108.0	235	215.9	168.3	273	-	152	82.6		171.4	-
8	550	127.0	305	269.7	219.1	318	-	178	95.3		222.2	-
10	675	165.1	375	323.9	273.0	419	-	229	108.0		277.4	-
12	760	184.2	441	381.0	323.8	464	-	254	120.7		328.2	-

Notes :

(a) For the 'BORE' (B1) other than Standard Wall Thickness, refer to page 54-55.
(b) These flanges may be supplied with a flat face. The flat face may be either the full t dimension of thickness plus 7mm, or the t dimension thickness without the raised face height.
(c) This dimension is for large end of hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and the back sdfface of the flange.

Unit : mm

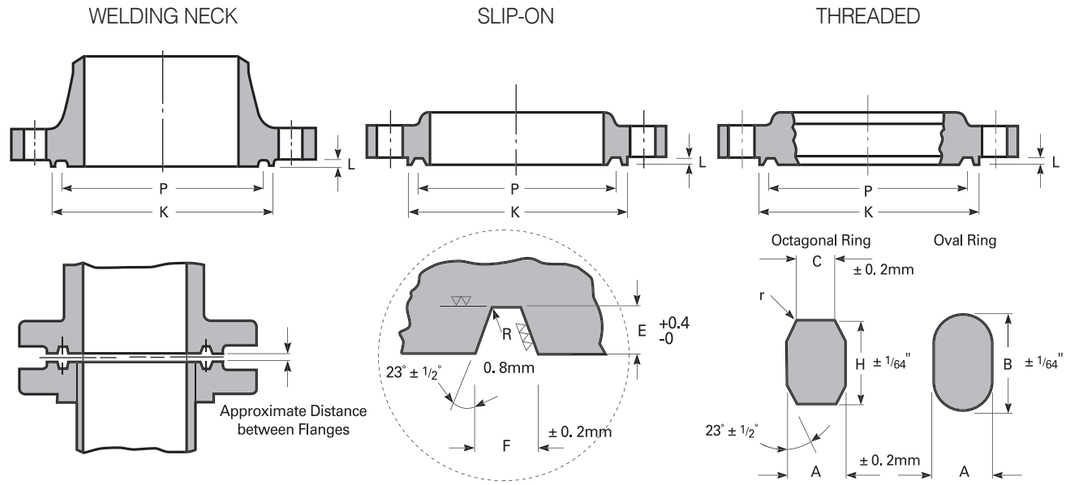
Nominal Pipe Size	Ridius of Fillet	DRILLING			BOLTING				APPROXIMATE WEIGHT(Kg)			
		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolt (inch)	Male and Female/ Tongue and Groove	Stud Bolt Length		Welding Neck	Slip-On/ Threaded	Lap Joint	Blind
							7mm Raised Face	Ring Joint				
	R											
1/2	3.0	88.9	4	22.2	3/4	115	120	120	3.18	3.18	3.00	3.18
3/4	3.0	95.2	4	22.2	3/4	120	125	125	4.08	4.08	3.63	4.54
1	3.0	108.0	4	25.4	7/8	135	140	140	5.45	5.44	4.99	5.44
1 1/4	5.0	130.2	4	28.6	1	145	150	150	9.07	8.16	7.26	8.16
1 1/2	6.0	146.0	4	31.8	1 1/8	165	170	170	11.35	11.00	9.99	10.44
2	8.0	171.4	8	28.6	1	170	180	180	19.07	17.25	16.80	17.71
2 1/2	8.0	196.8	8	31.8	1 1/8	190	195	205	23.61	24.97	24.06	25.42
3	10.0	228.6	8	34.9	1 1/4	215	220	230	42.68	37.68	36.32	39.04
4	11.0	273.0	8	41.3	1 1/2	250	255	260	64.00	58.00	54.48	60.38
5	11.0	323.8	8	47.6	1 3/4	290	300	310	110.68	95.25	92.53	101.15
6	13.0	368.3	8	54.0	2	335	345	355	176.46	146.51	143.01	156.63
8	13.0	438.2	12	54.0	2	375	380	395	261.27	219.99	213.38	240.62
10	13.0	539.8	12	66.7	2 1/2	485	490	510	484.43	419.57	408.60	465.36
12	13.0	619.1	12	73.0	2 3/4	535	540	560	692.35	590.20	572.95	664.06

(d) Blind flanges may be made with or without hubs at the manufacturer's option.
(e) Dimensions in B1 correspond to the inside diameters of pipe as given in ASME B36.10M for Standard Wall pipe. Thickness of Standard Wall is the same as Schedule 40 in sizes NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the purchaser.
(f) Class 2500 Slip-on are not by ASME B16.5, Slip-on flanges are at the manufacture's option.
(g) Thread Length(Q) and Length Through Hub(T3) are covered by ASME B16.5 only in sizes through 2 1/2 inch, over 2 1/2 inch is at the manufacture's option.

ASME B16.5-2003
RING JOINT FLANGES



CLASS 150 FLANGES



RING JOINT FLANGES FACING DIMENSIONS

Unit : mm

Nominal Pipe Size	Pitch Diam. Ring & Groove	Width of Ring	Height of Ring		Width Flat on Octa. Ring	Width of Groove	Depth of Groove	Diam. of R.F for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges
			Oval	Octagonal						
	P	A	B	H	C	F	E(L*)	K(Min)		
1	47.6	8	14.3	12.7	5.2	8.7	6.4	63.5	R15	4
1 1/4	57.2	8	14.3	12.7	5.2	8.7	6.4	73.0	R17	4
1 1/2	65.1	8	14.3	12.7	5.2	8.7	6.4	82.5	R19	4
2	82.6	8	14.3	12.7	5.2	8.7	6.4	102.0	R22	4
2 1/2	101.6	8	14.3	12.7	5.2	8.7	6.4	121.0	R25	4
3	114.3	8	14.3	12.7	5.2	8.7	6.4	133.0	R29	4
3 1/2	131.8	8	14.3	12.7	5.2	8.7	6.4	154.0	R33	4
4	149.2	8	14.3	12.7	5.2	8.7	6.4	171.0	R36	4
5	171.5	8	14.3	12.7	5.2	8.7	6.4	194.0	R40	4
6	193.7	8	14.3	12.7	5.2	8.7	6.4	219.0	R43	4
8	247.7	8	14.3	12.7	5.2	8.7	6.4	273.0	R48	4
10	304.8	8	14.3	12.7	5.2	8.7	6.4	330.0	R52	4
12	381.0	8	14.3	12.7	5.2	8.7	6.4	406.0	R56	4
14	396.9	8	14.3	12.7	5.2	8.7	6.4	425.0	R59	3
16	454.0	8	14.3	12.7	5.2	8.7	6.4	483.0	R64	3
18	517.5	8	14.3	12.7	5.2	8.7	6.4	546.0	R68	3
20	558.8	8	14.3	12.7	5.2	8.7	6.4	597.0	R72	3
24	673.1	8	14.3	12.7	5.2	8.7	6.4	711.0	R76	3

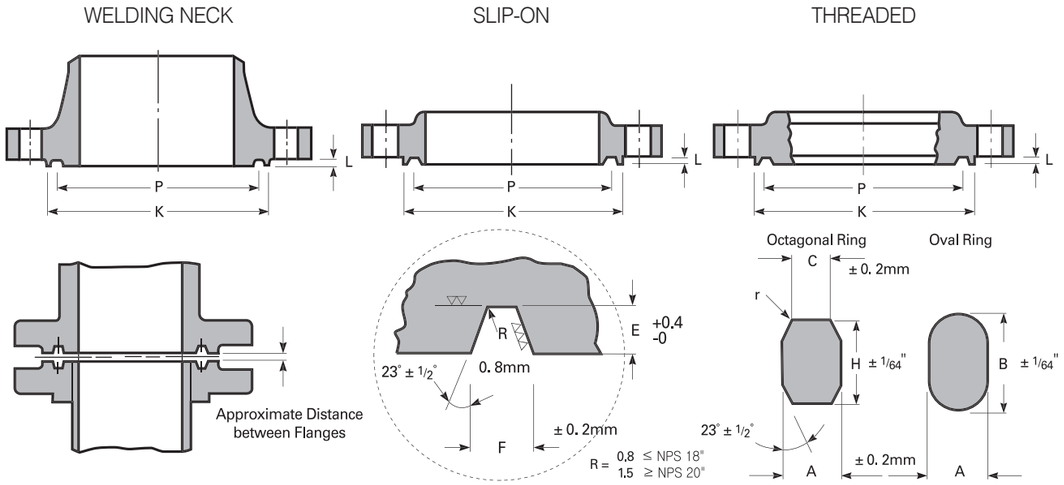
Notes :

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 flanges thickness.
* Raised face "L" is equal to groove dimension "E" but is not subject to tolerance 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 3/32" for ring width 1" and over.

TOLERANCES :

- E (depth) +0.4, –0.0
- F (width) ±0.2
- P (pitch diameter) ±0.13
- R (radius at bottom)
  R ≤ 2 +0.8, –0.0
  R > 2 ±0.8
- 23 deg (angle) ±1/2 deg

CLASS 300/400/600 FLANGES



RING JOINT FLANGES FACING DIMENSIONS

Unit : mm

Nominal Pipe Size	Pitch Diam. Ring & Groove	Width of Ring	Height of Ring		Width Flat on Octa. Ring	Width of Groove	Depth of Groove	Diam. of R.F for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges		
			Oval	Octagonal								
	P	A	B	H	C	F	E(L*)	K(Min)		CLASS 300	CLASS 400	CLASS 600
1/2	34.1	6.4	11.1	9.5	4.3	7.1	5.5	51.0	R11	3	-	3
3/4	42.9	8.0	14.3	12.7	5.2	8.7	6.4	63.5	R13	4	-	4
1	50.8	8.0	14.3	12.7	5.2	8.7	6.4	70.0	R16	4	-	4
1 1/4	60.3	8.0	14.3	12.7	5.2	8.7	6.4	79.2	R18	4	-	4
1 1/2	68.3	8.0	14.3	12.7	5.2	8.7	6.4	90.5	R20	4	-	4
2	82.6	11.1	17.5	15.9	7.7	11.9	7.9	108.0	R23	6	-	5
2 1/2	101.6	11.1	17.5	15.9	7.7	11.9	7.9	127.0	R26	6	-	5
3	123.8	11.1	17.5	15.9	7.7	11.9	7.9	146.0	R31	6	-	5
3 1/2	131.8	11.1	17.5	15.9	7.7	11.9	7.9	159.0	R34	6	-	5
4	149.2	11.1	17.5	15.9	7.7	11.9	7.9	175.0	R37	6	6	5
5	181.0	11.1	17.5	15.9	7.7	11.9	7.9	210.0	R41	6	6	5
6	211.1	11.1	17.5	15.9	7.7	11.9	7.9	241.0	R45	6	6	5
8	269.9	11.1	17.5	15.9	7.7	11.9	7.9	302.0	R49	6	6	5
10	323.9	11.1	17.5	15.9	7.7	11.9	7.9	356.0	R53	6	6	5
12	381.0	11.1	17.5	15.9	7.7	11.9	7.9	413.0	R57	6	6	5
14	419.1	11.1	17.5	15.9	7.7	11.9	7.9	457.0	R61	6	6	5
16	469.9	11.1	17.5	15.9	7.7	11.9	7.9	508.0	R65	6	6	5
18	533.4	11.1	17.5	15.9	7.7	11.9	7.9	575.0	R69	6	6	5
20	584.2	12.7	19.1	17.5	8.7	13.5	9.5	635.0	R73	6	6	5
24	692.2	15.9	22.2	20.7	10.5	16.7	11.1	749.0	R77	6	6	6

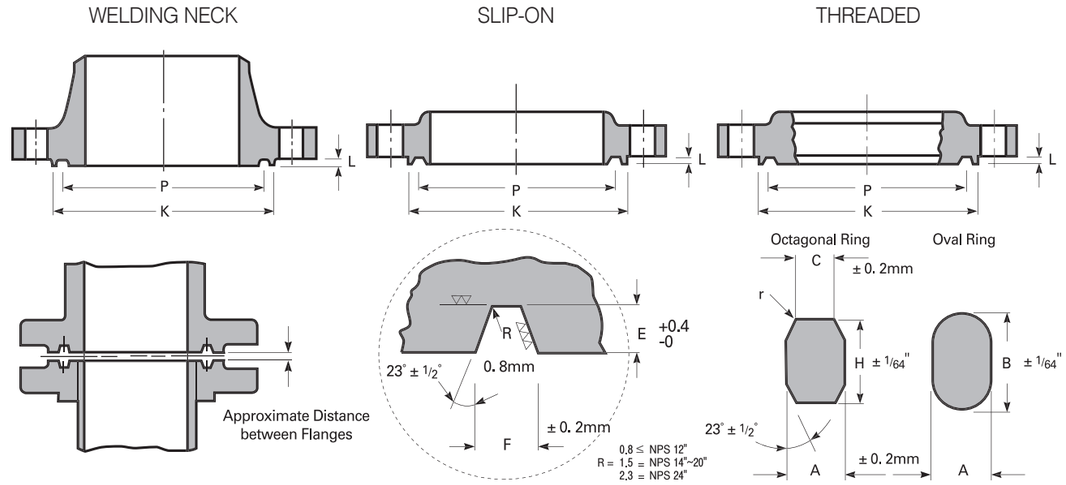
Notes :

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 fl anges thickness.
* Raised face "L" is equal to groove dimension "E" but is not subject to tolerance 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 3/32" for ring width 1" and over.

TOLERANCES :

- E (depth) +0.4, –0.0
- F (width) ±0.2
- P (pitch diameter) ±0.13
- R (radius at bottom)
  R ≤ 2 +0.8, –0.0
  R > 2 ±0.8
- 23 deg (angle) ±1/2 deg

CLASS 900 FLANGES



RING JOINT FLANGES FACING DIMENSIONS

Unit : mm

Nominal Pipe Size	Pitch Diam. Ring & Groove	Width of Ring	Height of Ring		Width Flat on Octa. Ring	Width of Groove	Depth of Groove	Diam. of R.F for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges
			Oval	Octagonal						
	P	A	B	H	C	F	E(L*)	K(Min)		
1/2	39.7	8.0	14.3	12.7	5.2	8.74	6.35	60.5	R12	4
3/4	44.5	8.0	14.3	12.7	5.2	8.74	6.35	66.5	R14	4
1	50.8	8.0	14.3	12.7	5.2	8.74	6.35	71.5	R16	4
1 1/4	60.3	8.0	14.3	12.7	5.2	8.74	6.35	81.0	R18	4
1 1/2	68.3	8.0	14.3	12.7	5.2	8.74	6.35	92.0	R20	4
2	95.3	11.1	17.5	15.9	7.7	11.91	7.92	124.0	R24	3
2 1/2	108.0	11.1	17.5	15.9	7.7	11.91	7.92	136.7	R27	3
3	123.8	11.1	17.5	15.9	7.7	11.9	7.9	156.0	R31	4
4	149.2	11.1	17.5	15.9	7.7	11.9	7.9	181.0	R37	4
5	181.0	11.1	17.5	15.9	7.7	11.9	7.9	216.0	R41	4
6	211.1	11.1	17.5	15.9	7.7	11.9	7.9	241.0	R45	4
8	269.9	11.1	17.5	15.9	7.7	11.9	7.9	308.0	R49	4
10	323.9	11.1	17.5	15.9	7.7	11.9	7.9	362.0	R53	4
12	381.0	11.1	17.5	15.9	7.7	11.9	7.9	419.0	R57	4
14	419.1	15.9	22.2	20.7	10.5	16.7	11.1	467.0	R62	4
16	469.9	15.9	22.2	20.7	10.5	16.7	11.1	524.0	R66	4
18	533.4	19.1	25.4	23.8	11.1	19.8	12.7	594.0	R70	5
20	584.2	19.1	25.4	23.8	12.3	19.8	12.7	648.0	R74	5
24	692.2	25.4	33.4	31.8	17.3	27.0	15.9	772.0	R78	6

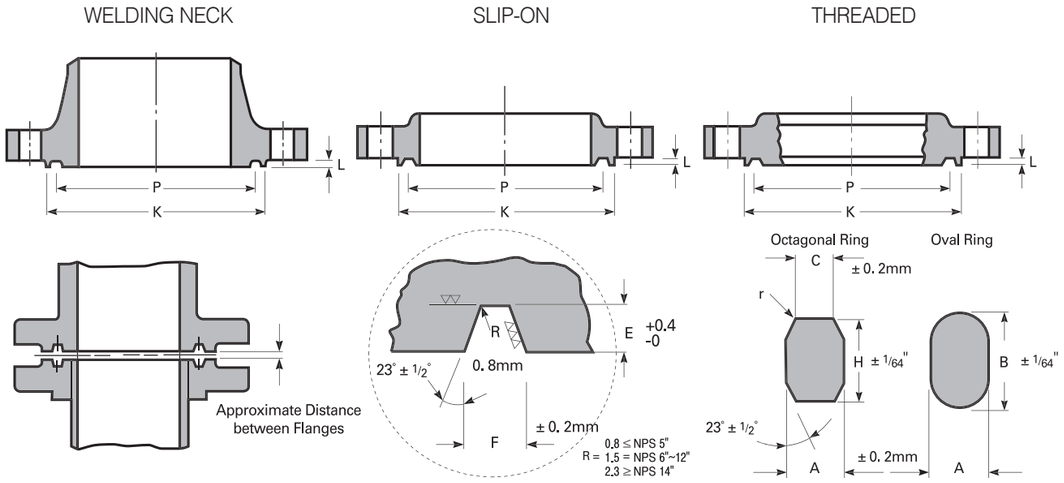
Notes :

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 flanges thickness.
* Raised face "L" is equal to groove dimension "E" but is not subject to tolerance 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 3/32" for ring width 1" and over.

TOLERANCES :

- E (depth) +0.4, –0.0
- F (width) ±0.2
- P (pitch diameter) ±0.13
- R (radius at bottom)
  R ≤ 2 +0.8, –0.0
  R > 2 ±0.8
- 23 deg (angle) ±1/2 deg

CLASS 1500 FLANGES



RING JOINT FLANGES FACING DIMENSIONS

Unit : mm

Nominal Pipe Size	Pitch Diam. Ring & Groove	Width of Ring	Height of Ring		Width Flat on Octa. Ring	Width of Groove	Depth of Groove	Diam. of R.F for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges
			Oval	Octagonal						
	P	A	B	H	C	F	E(L*)	K(Min)		
1/2	39.7	8.0	14.3	12.7	5.2	8.74	6.35	60.5	R12	4
3/4	44.5	8.0	14.3	12.7	5.2	8.74	6.35	66.5	R14	4
1	50.8	8.0	14.3	12.7	5.2	8.74	6.35	71.5	R16	4
1 1/4	60.3	8.0	14.3	12.7	5.2	8.74	6.35	81.0	R18	4
1 1/2	68.3	8.0	14.3	12.7	5.2	8.74	6.35	92.0	R20	4
2	95.3	11.1	17.5	15.9	7.7	11.91	7.92	124.0	R24	3
2 1/2	108.0	11.1	17.5	15.9	7.7	11.91	7.92	137.0	R27	3
3	136.5	11.1	17.5	15.9	7.7	11.91	7.92	168.0	R35	3
4	161.9	11.1	17.5	15.9	7.7	11.91	7.92	194.0	R39	3
5	193.7	11.1	17.5	15.9	7.7	11.91	7.92	229.0	R44	3
6	211.1	12.7	19.1	17.5	8.7	13.49	9.53	248.0	R46	3
8	269.9	15.9	22.2	20.7	10.5	16.67	11.13	318.0	R50	4
10	323.9	15.9	22.2	20.7	10.5	16.67	11.13	371.0	R54	4
12	381.0	22.2	28.6	27.0	14.8	23.01	14.27	438.0	R58	5
14	419.1	25.4	33.4	31.8	17.3	27.00	15.88	489.0	R63	6
16	469.9	28.6	36.5	34.9	19.8	30.18	17.48	546.0	R67	8
18	533.4	28.6	36.5	34.9	19.8	30.18	17.48	613.0	R71	8
20	584.2	31.8	39.7	38.1	22.3	33.32	17.48	673.0	R75	10
24	692.2	34.9	44.5	41.3	24.8	36.53	20.62	794.0	R79	11

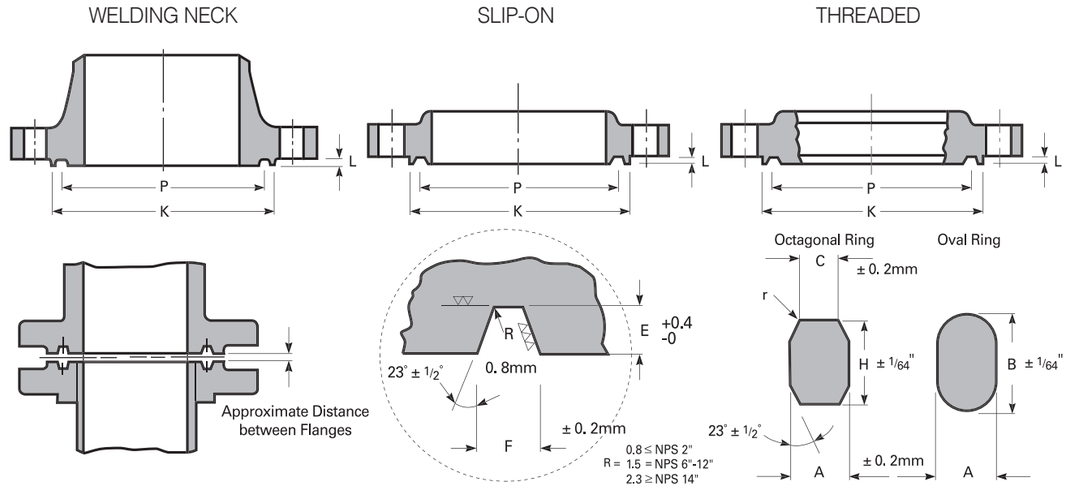
Notes :

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 flanges thickness.
* Raised face "L" is equal to groove dimension "E" but is not subject to tolerance 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 3/32" for ring width 1" and over.

TOLERANCES :

- E (depth) +0.4, –0.0
- F (width) ±0.2
- P (pitch diameter) ±0.13
- R (radius at bottom)
  R ≤ 2 +0.8, –0.0
  R > 2 ±0.8
- 23 deg (angle) ±1/2 deg

CLASS 2500 FLANGES



RING JOINT FLANGES FACING DIMENSIONS

Unit : mm

Nominal Pipe Size	Pitch Diam. Ring & Groove	Width of Ring	Height of Ring		Width Flat on Octa. Ring	Width of Groove	Depth of Groove	Diam. of R.F for Ring Joint or Lapped	Ring Number	Approximate Distance Between Flanges
			Oval	Octagonal						
	P	A	B	H	C	F	E(L*)	K(Min)		
1/2	42.9	8.0	14.3	12.7	5.2	8.7	6.4	65.0	R13	13
3/4	50.8	8.0	14.3	12.7	5.2	8.7	6.4	73.0	R16	16
1	60.3	8.0	14.3	12.7	5.2	8.7	6.4	82.5	R18	18
1 1/4	72.2	11.1	17.5	15.9	7.7	11.9	7.9	102.0	R21	21
1 1/2	82.6	11.1	17.5	15.9	7.7	11.9	7.9	114.0	R23	23
2	101.6	11.1	17.5	15.9	7.7	11.9	7.9	133.0	R26	26
2 1/2	111.1	12.7	19.1	17.5	8.7	13.5	9.5	149.0	R28	28
3	127.0	12.7	19.1	17.5	8.7	13.5	9.5	168.0	R32	32
4	157.2	15.9	22.2	20.7	10.5	16.7	11.1	203.0	R38	38
5	190.5	19.1	25.4	23.8	12.3	19.8	12.7	241.0	R42	42
6	228.6	19.1	25.4	23.8	12.3	19.8	12.7	279.0	R47	47
8	279.4	22.2	28.6	27.0	14.8	23.0	14.3	340.0	R51	51
10	342.9	28.6	36.5	34.9	19.8	30.2	17.5	425.0	R55	55
12	406.4	31.8	39.7	38.1	22.3	33.3	17.5	495.0	R60	60

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 flanges thickness.
* Raised face "L" is equal to groove dimension "E" but is not subject to tolerance 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 3/32" for ring width 1" and over.

TOLERANCES :

- E (depth) +0.4, –0.0
- F (width) ±0.2
- P (pitch diameter) ±0.13
- R (radius at bottom)
  R ≤ 2 +0.8, –0.0
  R > 2 ±0.8
- 23 deg (angle) ±1/2 deg

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 dimesions also agree with the dimensions of a standrd flanges 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. The size designation is NPS 6 × 2 1/2 - Class 300 reducing threaded flange.
This flange has the following dimensions : following dimensions :
NPS 2 1/2 = taper pipe thread tapping (ASME B1.20.1)
320 mm = diameter of regular NPS 6 Class 300 threaded flange
35 mm = thickness of regular NPS 6 Class 300 threaded flange
178 mm = diameter of hub for regular NPS 5 Class 300 threaded flange. Hub diameter may be one size small to reduce machining. In this example a hub diameter of NPS 2 1/2 would be the smallest acceptable.
15.5 mm = height of hub for regular NPS 5 Class 300 threaded flange.

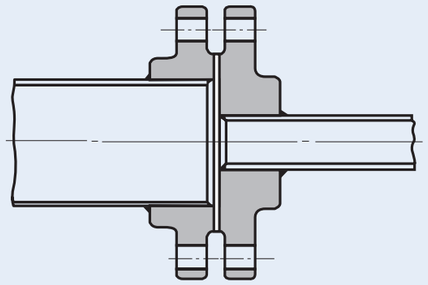
B. The size designation is NPS 6 × 2 - Class 300 reducing threaded flange. Use regular NPS 6 Class 300 blind flange tapped with NPS 2 taper pipe thread (ASME B1.20.1).

WELDING NECK TYPES

On Reducing Welding Neck Flages, 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 dimenisons, including the drilling template, agree with the standard dimensions of the size from which the reduction is being made.

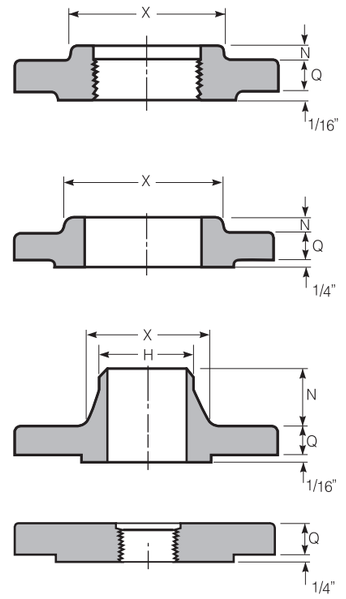
REDUCING FLANGES

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 a 3" (76. 2mm)nominal pipe size should be designated as a 3" ×12 1/ 2" -300lb. Reducing Flange.
whether Threaded, Slip-On, or Welding Neck type is desired must also be specified.



ASME B16.5 FORGED FLANGES

Dimensions in mm

	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	
Nominal Pipe Size to Which Reduction made tobe is to be Specified by Purchaser	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	127.5	155.6	155.6	155.6	177.8	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	200.6	209.6	209.6	266.7	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	-	-	101.6
	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

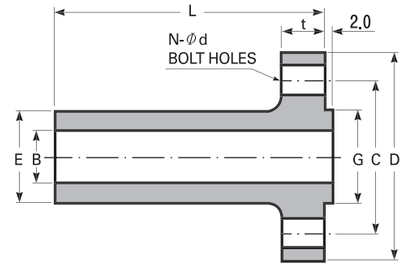
Notes : For reductions to sizes smaller than shown, blind flanges are tappde or bored for specified nominal pipe size

ASME B16.5-2003

LONG WELDING NECK

LONG WELDING NECK FLANGES





CLASS 150

Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1/2	90	35.1	30.2	12.7	9.6	229	60.3	4	15.9
3/4	100	42.9	38.1	19.1	11.2	229	69.9	4	15.9
1	110	50.8	50.8	25.4	12.7	229	79.4	4	15.9
1 1/4	115	63.5	60.5	31.8	14.3	229	88.9	4	15.9
1 1/2	125	73.2	66.5	38.1	15.9	229	98.4	4	15.9
2	150	91.9	77.7	50.8	17.5	229	120.7	4	19.1
2 1/2	180	104.6	95.3	63.5	20.7	229	139.7	4	19.1
3	190	127.0	108.0	76.2	22.3	229	152.4	4	19.1
3 1/2	215	139.7	124.0	88.9	22.3	229	177.8	8	19.1
4	230	157.2	139.7	101.6	22.3	229	190.5	8	19.1
5	255	185.7	165.1	127.0	22.3	305	215.9	8	22.2
6	280	215.9	196.9	152.4	23.9	305	241.3	8	22.2
8	345	269.7	247.7	203.2	27.0	305	298.5	8	22.2
10	405	323.9	304.8	254.0	28.6	305	362.0	12	25.4
12	485	381.0	365.3	304.8	30.2	305	431.8	12	25.4
14	535	412.8	406.4	355.6	33.4	305	476.3	12	28.6
16	595	469.9	457.2	406.4	35.0	305	539.8	16	28.6
18	635	533.4	508.0	457.2	38.1	305	577.9	16	31.8
20	700	584.2	558.8	508.0	41.3	305	635.0	20	31.8
24	815	692.2	666.8	609.6	46.1	305	749.3	20	34.9

CLASS 300

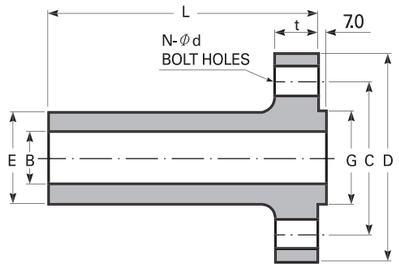
Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1/2	95	35.1	38.1	12.7	14.3	229	66.7	4	15.9
3/4	115	42.9	47.8	19.1	15.9	229	82.6	4	19.1
1	125	50.8	53.8	25.4	17.5	229	88.9	4	19.1
1 1/4	135	63.5	63.5	31.8	19.1	229	98.4	4	19.1
1 1/2	155	73.2	69.9	38.1	20.7	229	114.3	4	22.2
2	165	91.9	84.1	50.8	22.3	229	127.0	8	19.1
2 1/2	190	104.6	100.1	63.5	25.4	229	149.2	8	22.2
3	210	127.0	117.3	76.2	28.6	229	168.3	8	22.2
3 1/2	230	139.7	133.4	88.9	30.2	229	184.2	8	22.2
4	255	157.2	146.1	101.6	31.8	229	200.0	8	22.2
5	280	185.7	177.8	127.0	35.0	305	235.0	8	22.2
6	320	215.9	206.2	152.4	36.6	305	269.9	12	22.2
8	380	269.7	260.4	203.2	41.3	305	330.2	12	25.4
10	445	323.9	320.5	254.0	47.7	305	387.4	16	28.6
12	520	381.0	374.7	304.8	50.8	305	450.8	16	31.8
14	585	412.8	425.5	355.6	54.0	305	514.4	20	31.8
16	650	469.9	482.6	406.4	57.2	305	571.5	20	34.9
18	710	533.4	533.4	457.2	60.4	305	628.6	24	34.9
20	775	584.2	587.2	508.0	63.5	305	685.8	24	34.9
24	915	692.2	701.5	609.6	69.9	305	812.8	24	41.3

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

LONG WELDING NECK FLANGES





CLASS 400

Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1	125	50.8	53.8	25.4	17.5	229	88.9	4	19.1
1 1/4	135	63.5	63.5	31.8	20.7	229	98.4	4	19.1
1 1/2	155	73.2	69.9	38.1	22.3	229	114.3	4	22.2
2	165	91.9	84.1	50.8	25.4	229	127.0	8	19.1
2 1/2	190	104.6	100.1	63.5	28.6	229	149.2	8	22.2
3	210	127.0	117.3	76.2	31.8	229	168.3	8	22.2
3 1/2	230	139.7	133.4	88.9	35.0	229	184.2	8	25.4
4	255	157.2	146.1	101.6	35.0	229	200.0	8	25.4
5	280	185.7	177.8	127.0	38.1	305	235.0	8	25.4
6	320	215.9	206.2	152.4	41.3	305	269.9	12	25.4
8	380	269.7	260.4	203.2	47.7	305	330.0	12	28.4
10	445	323.9	320.5	254.0	54.0	305	387.4	16	31.8
12	520	381.0	374.7	304.8	57.2	305	450.8	16	35.1
14	585	412.8	425.5	355.6	60.4	305	514.4	20	35.1
16	650	469.9	482.6	406.4	63.5	305	571.5	20	38.1
18	710	533.4	533.4	457.2	66.7	305	628.6	24	38.1
20	775	584.2	587.2	508.0	69.9	305	685.8	24	41.1
24	915	692.2	701.5	609.6	76.2	305	812.8	24	47.8

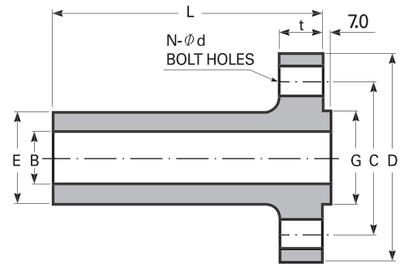
CLASS 600

Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1	125	50.8	53.8	25.4	17.5	229	88.9	4	19.1
1 1/4	135	63.5	63.5	31.8	20.7	229	98.4	4	19.1
1 1/2	155	73.2	69.9	38.1	22.3	229	114.3	4	22.2
2	165	91.9	84.1	50.8	25.4	229	127.0	8	19.1
2 1/2	190	104.6	100.1	63.5	28.6	229	149.2	8	22.2
3	210	127.0	117.3	76.2	31.8	229	168.3	8	22.2
3 1/2	230	139.7	133.4	88.9	35.0	229	184.2	8	25.4
4	275	157.2	152.4	101.6	38.1	229	215.9	8	25.4
5	330	185.7	190.5	127.0	44.5	305	266.7	8	28.6
6	355	215.9	222.3	152.4	47.7	305	292.1	12	28.6
8	420	269.7	273.1	203.2	55.6	305	349.2	12	31.8
10	510	323.9	342.9	254.0	63.5	305	431.8	16	34.9
12	560	381.0	400.1	304.8	66.7	305	489.0	20	34.9
14	605	412.8	431.8	355.6	69.9	305	527.0	20	38.1
16	685	469.9	495.3	406.4	76.2	305	603.2	20	41.3
18	745	533.4	546.1	457.2	82.6	305	654.0	20	44.5
20	815	584.2	609.1	508.0	88.9	305	723.9	24	44.5
24	940	692.2	717.6	609.6	101.6	305	838.2	24	50.8

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





CLASS 900

Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1	150	50.8	52.3	25.4	28.6	229	101.6	4	25.4
1 1/4	160	63.5	63.5	31.8	28.6	229	111.1	4	25.4
1 1/2	180	73.2	69.9	38.1	31.8	229	123.8	4	28.6
2	215	91.9	104.6	50.8	38.1	229	165.1	8	25.4
2 1/2	245	104.6	124.0	63.5	41.3	229	190.5	8	28.6
3	240	127.0	127.0	76.2	38.1	229	190.5	8	25.4
4	290	157.2	158.8	101.6	44.5	229	235.0	8	31.8
5	350	185.7	190.5	127.0	50.8	229	279.4	8	34.9
6	380	215.9	235.0	152.4	55.6	305	317.5	12	31.8
8	470	269.7	298.5	203.2	63.5	305	393.7	12	38.1
10	545	323.9	368.3	254.0	69.9	305	469.9	16	38.1
12	610	381.0	419.1	304.8	79.4	305	533.4	20	38.1
14	640	412.8	450.9	355.6	85.8	-	558.8	20	41.3
16	705	469.9	508.0	406.4	88.9	-	616.0	20	44.5
18	785	533.4	565.2	457.2	101.6	-	685.8	20	50.8
20	855	584.2	622.3	508.0	108.0	-	749.3	20	54.0
24	1040	692.2	749.3	609.6	139.7	-	901.7	20	66.7

CLASS 1500

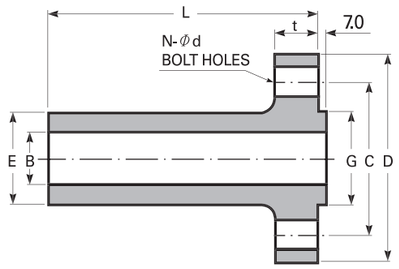
Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1	150	50.8	52.3	25.4	28.6	229	101.6	4	25.4
1 1/4	160	63.5	63.5	31.8	28.6	229	111.1	4	25.4
1 1/2	180	73.2	69.9	38.1	31.8	229	123.8	4	28.6
2	215	91.9	104.6	50.8	38.1	229	165.1	8	25.4
2 1/2	245	104.6	124.0	63.5	41.3	229	190.5	8	28.6
3	265	127.0	133.4	76.2	47.7	229	203.2	8	31.8
4	310	157.2	162.1	101.6	54.0	229	241.3	8	34.9
5	375	185.7	196.9	127.0	73.1	229	292.1	8	41.3
6	395	215.9	228.6	152.4	82.6	305	317.5	12	38.1
8	485	269.7	292.1	203.2	92.1	305	393.7	12	44.5
10	585	323.9	368.3	254.0	108.0	305	482.6	12	50.8
12	675	381.0	450.9	304.8	123.9	305	571.5	16	54.0
14	750	412.8	495.3	355.6	133.4	-	635.0	16	60.3
16	825	469.9	552.5	406.4	146.1	-	704.8	16	66.7
18	915	533.4	596.9	457.2	162.0	-	774.7	16	73.0
20	985	584.2	641.4	508.0	177.8	-	831.8	16	79.4
24	1170	692.2	762.0	609.6	203.2	-	990.6	16	92.1

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

CLASS 2500 FLANGES





LONG WELDING NECK

Unit : mm

Nominal Pipe Size	Outside Diameter	O.D of Raised Face	Hub Diam. at Bevel	Diameter of Bore	Thickness of Flange Min	Length Through Hub	Diameter of Bolt Circle	Number of Holes	Diameter of Holes
	D	G	E	B	t	L	C	N	d
1	160	50.8	57.2	25.4	35.0	229	108.0	4	25.4
1 1/4	185	63.5	73.2	31.8	38.1	229	130.2	4	28.6
1 1/2	205	73.2	79.2	38.1	44.5	229	146.0	4	31.8
2	235	91.9	95.3	50.8	50.9	229	171.4	8	28.6
2 1/2	265	104.6	114.3	63.5	57.2	229	196.8	8	31.8
3	305	127.0	133.4	76.2	66.7	229	228.6	8	34.9
4	355	157.2	165.1	101.6	76.2	229	273.0	8	41.3
5	420	185.7	203.2	127.0	92.1	229	323.8	8	47.6
6	485	215.9	235.0	152.4	108.0	305	368.3	8	54.0
8	550	269.7	304.8	203.2	127.0	305	438.2	12	54.0
10	675	323.9	374.7	254.0	165.1	305	539.8	12	66.7
12	760	381.0	441.5	304.8	184.2	305	619.1	12	73.0

Notes :

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

▶ **Straight Hub Welding Flanges**

- Straight Hub Welding Flanges are an extension of Welding Neck flanges and have straight hubs of uniform thickness.
  With the exception of the following, the straight hub welding flanges shall have dimensions of the welding neck flanges of the size.

Forged Vessel Connections





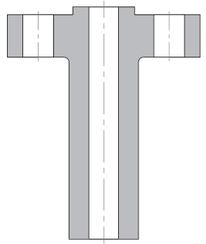






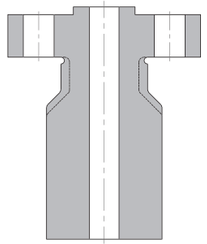


FVC(Forged Vessel Connections)



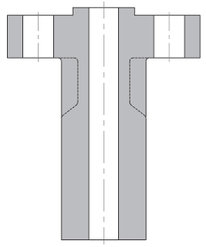
Long Welding Neck
Type "LWN"

The "LWN"is FVC'S basic standard flanged connection. This seamless product offers a nominal bore as well as a heavy wall thickness, making it ideal for highly corrosive applications.



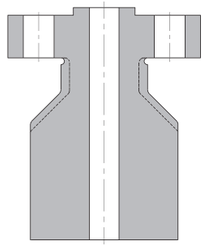
Variable Body Connections
Type "V1"

Never before has a manufacturer offered so many standard barrel thicknesses in seamless connections. This variety enables FVC to prcvide a sufficient amount of integral reinforcement required while keeping nozzle weight and cost down to a minimum. Don' compromise with an espensive "ustom" forging when you can find the required barrel diameter in the standard FVC "ariable Body" charts on the following pages. The FVC "ariable Body" connections provide more integral reinforcement than an "B"neck, without the added cost of a custom forging or the added cdst and weight of an "" connection.



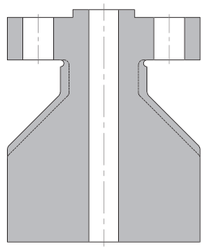
Heavy Barrel Connection
Type "HB"

The "HB"neck furnishes more integral reinforcement than the corresponding size FVC "LWN"which is accomplished with a thicker barrel neck section.
There are additional featyres on this style neck:
1)On FVC "HB" necks an automatic "nut stop" is provided by the standard barrel O.D. This eliminates the need for a second holding wrench. An optional "nut relief"in the barrel will allow two wrench operation.
2)FVC "HB"necks, sizes 12 inch and below are furnished with Sch 80 bores. Manway sizes 14 inch and above have bores equal to the nominal size.



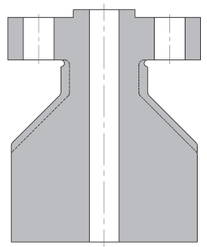
Variable Body Connections
Type "V2"

Optional Festures
All FVC connections are available with the following optional features:
1) contoured bottoms : "ylindrical" "pherical,"or"illside"
2) special lingths, longer or shorter than the standard lengths listed in the price list are on problem for FVC.
3) insert lips, contour forged or contour machined
4) additional facings, standard B16.5 or custom designs.
5) "nut stop"barrel, "except on LWN'),
6) optional Barrel O.D. and I.D.
7)FVC can also make LWN's, HBs, Variable Body Nozzles, and F Nozzles to ASME B16.47 Series A and Series B.



Full Barrel Connection
Type "F"

The FVCType ""body connection provides the most reinforcement among the standard connections. The barrel O.D. is the same as the flange O.D.



Variable Body Connections
Type "V3"

WELDING NECK

Place	Diameter D	Range	Tolerance (mm)
Outside Diameter	O	When O.D is 24" or Less	±1.5(±0.06in)
		When O.D is Over 24"	±3.0(±0.12in)
Inside Diameter	B	10" and Smaller	±0.76(±0.03in)
		12" thru 18"	±1.5(±0.06in)
		20" and Larger	+3.0(+0.12in) -1.5(-0.06in)
Diameter of Contact Face	R	1.6mm Raised Face (Outside)	±0.76(±0.03in.)
		6.4mm Raised Face (Outside)	±0.51(±0.02in.)
Drilling	C	Bolt Circle Diameter	±1.5(±0.06 in)
Thickness	T	When O.D is 18" or Less	+3.0(+0.12in) -0.0(-0.0in)
		When O.D is Over 20"	+4.8(+0.19in) -0.0(-0.0in)

Place		Range	Tolerance (mm)
Total Length	OVL	For STD. Lengths	±3.2(±0.125in)
		For Non-STD.	+3.2(+0.125in) -0.0(-0.0in)
Nut Relief	NR		+1.6(+0.625in) -0.0(-0.0in)
Nut Stop	NS		+0.0(+0.0in) -1.6(-0.0625in)
Nut Relief Length	NL		+3.2(+0.125in) -0.76(-0.03in)
Barrel Out Diameter	D (DV1,2,3)	For All HB Necks	+0.0(+0.0in) -1.6(-0.0625in)
		For All Other Styles 4"&Below	+2.4(+0.09375in) -0.79(-0.03125in)
		For All Other Styles 5"&Over	+3.97(+0.15625in) -0.79(-0.03125in)
Face Thickness		1.6mm Raised Face	±0.39(±0.01563in)
		6.4mm Raised Face	±0.79(±0.03125in)
		RTJ Face	±0.79(±0.03125in)

FVC(Forged Vessel Connections)

Notes for FVC Standard and Variable Body Connections

Codes
Material and manufacturing practices for FVC connections are in compliance with ASME Section II, Section VIII Division 1, ASME B16.5, ASME B31.3, and ASME B31.4. Other requirements can be met when specified.

Materials
FVC forged connections are made from SA-105 in compliance with ASME Section II. FVC connections are available in other material compositions upon request. See the “Technical Section” on page 59 for materials stocked by FVC.

Lengths
The length of all connections includes the barrel, flange and facing. See the current FVC price sheet for standard lengths. Intermediate lengths and lengths longer than standard are available upon request.

Facings
All FVC flanges are furnished with a raised face per ASME B16.5. A 0.06-inch raised face is provided on CLASS 150 and 300 flanges and it is included in the “T” dimension. A 0.25-inch raised face is provided on CLASS 400 and above flanges and it is excluded from the “T” dimension. See the “Technical Section,” pages 62 through 65, for other types of facings available on FVC flanges. Gaskets are not furnished by FVC.

Bolting and Tolerances
FVC flanges are furnished to ASME B16.5 specifications unless otherwise specified. See the “Technical Section,” pages 60 and 61, for complete FVC tolerances. Bolting is not furnished by FVC.

Nut Relief
All FVC connections, except standard LWN’s, will be supplied with a “nut stop O.D.” unless a “nut relief O.D.” is specified.

Nut Stop
All FVC “HB”, “V1”, “V2”, “V3” and “F” style connections are furnished with “nut stop O.D.” (not available on “LWN” barrels). This barrel O.D. acts as an automatic nut stop, preventing the nut from turning, thus only requiring one wrench to loosen or tighten bolting on the connecting pipe side.

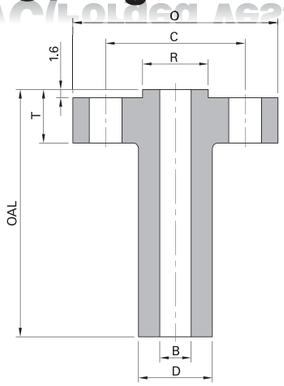
Bore
Standard bores on all FVC connections are to the nominal flange size except for 12” and smaller “HB” and “Variable Body” connections which are bored to match schedule 80 pipe.
Larger or smaller bores can be provided on all FVC connections upon request.

Underside Curvatures
All FVC connections can be furnished contoured to fit any shell, head or cone at a minimal cost.
Unless otherwise specified, all connections will be furnished with flat bottom.

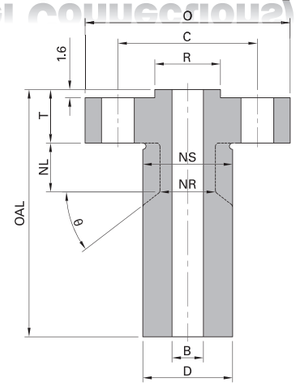
Press-Temp Ratings
All FVC flanges are furnished to conform to ASME B16.5 pressure-temperature ratings. See the “Technical Section,” pages 68 through 72, for rating charts and notes regarding allowable design pressures and hydrotest pressures.

Heat Treatment
All standard FVC connections over CLASS 300 rating and CLASS 300 “HB”, “V1”, “V2”, “V3” and “F” connections are supplied in the normalized condition. Additional heat treating requirements can be furnished upon request.

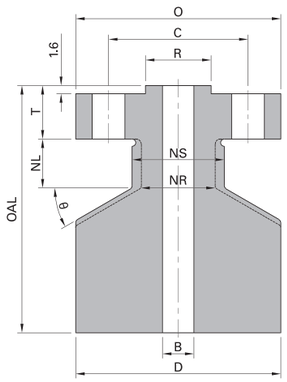
FVC(Forged Vessel Connections)



Long Welding Neck
Type "LWN"



Heavy Barrel Connection
Type "HB"



FullBarrel Connection
Type "F"

CLASS 150

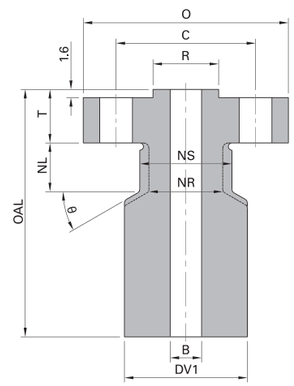
Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
							LWN/F	HB/V
	O	T	R	-	-	C	B	B
1/2	88.9	11.2	35.1	4	15.7	60.5	12.7	14.0
3/4	98.6	12.7	42.9	4	15.7	69.9	19.1	18.8
1	108.0	14.2	50.8	4	15.7	79.2	25.4	24.4
1 1/4	117.3	15.7	63.5	4	15.7	88.9	31.8	32.5
1 1/2	127.0	17.5	73.2	4	15.7	98.6	38.1	38.1
2	152.4	19.1	91.9	4	19.1	120.7	50.8	49.3
2 1/2	177.8	22.4	104.6	4	19.1	139.7	63.5	58.9
3	190.5	23.9	127.0	4	19.1	152.4	76.2	73.7
3 1/2	215.9	23.9	139.7	8	19.1	177.8	88.9	85.3
4	228.6	23.9	157.2	8	19.1	190.5	101.6	97.3
5	254.0	23.9	185.7	8	22.4	215.9	127.0	122.2
6	279.4	25.4	215.9	8	22.4	241.3	152.4	146.3
8	342.9	28.4	269.7	8	22.4	298.5	203.2	193.5
10	406.4	30.2	323.9	12	25.4	362.0	254.0	242.8
12	482.6	31.8	381.0	12	25.4	431.8	304.8	289.1
14	533.4	35.1	412.8	12	28.4	476.3	355.6	355.6
16	596.9	36.6	469.9	16	28.4	539.8	406.4	406.4
18	635.0	39.6	533.4	16	31.8	577.9	457.2	457.2
20	698.5	42.9	584.2	20	31.8	635.0	508.0	508.0
24	812.8	47.8	692.2	20	35.1	749.3	609.6	609.6

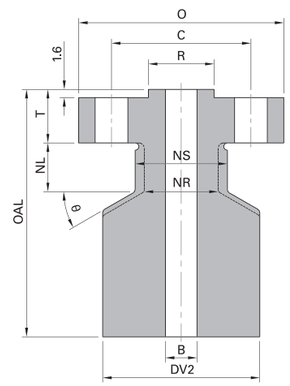
Size	Barrel O.D						HB & F TYPE		
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	31.8	38.1	88.9	-	-	-	38.1	31.8	19.1
3/4	41.1	47.8	98.6	-	-	-	47.8	41.1	19.1
1	50.8	57.2	108.0	69.9	82.6	101.6	57.2	50.8	19.1
1 1/4	60.5	66.5	117.6	-	-	-	66.5	60.5	19.1
1 1/2	66.5	76.2	127.0	82.6	101.6	117.3	76.2	66.5	19.1
2	77.7	93.7	152.4	101.6	117.3	139.7	93.7	77.7	22.4
2 1/2	95.3	112.8	177.8	117.3	146.1	152.4	112.8	95.3	22.4
3	108.0	125.5	190.5	146.1	152.4	162.1	125.5	108.0	22.4
3 1/2	124.0	150.9	215.9	162.1	177.8	196.9	150.9	124.0	22.4
4	139.7	163.6	228.6	177.8	196.9	209.6	163.6	139.7	22.4
5	165.1	184.2	254.0	196.9	209.6	225.6	184.2	165.1	25.4
6	196.9	209.6	279.4	225.6	251.0	263.7	209.6	196.9	25.4
8	247.7	266.7	342.9	279.4	292.1	307.8	266.7	247.7	25.4
10	304.8	325.4	406.4	342.9	362.0	384.0	325.4	304.8	28.4
12	365.3	395.2	482.6	412.8	441.5	463.6	395.2	365.3	28.4
14	406.4	434.8	533.4	463.6	492.3	511.0	434.8	406.4	31.8
16	457.2	498.3	596.9	511.0	533.4	565.2	498.3	457.2	31.8
18	508.0	531.9	635.0	565.2	590.6	612.6	531.9	508.0	35.1
20	558.8	589.0	698.5	612.6	635.0	666.8	589.0	558.8	35.1
24	666.8	698.5	812.8	704.9	743.0	781.1	698.5	666.8	38.1

Notes :

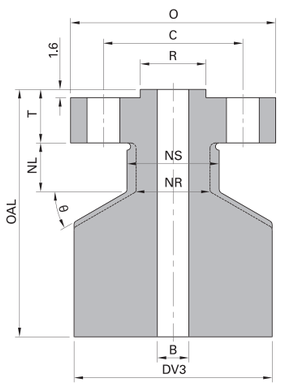
1) Length : The length of all connections includes the barrel, flange and facing. See the current FVC price sheet for standard lengths.
   Intermediate lengths and longer are available upon request.
2) Facing : The FVC flange thickness "T" includes 0.06 inch raised face per ASME B16.5. This differs on Class 400 and above.
   FVC can supply any special facing as needed upon request.



Variable Body Connections
Type "V1"



Variable Body Connections
Type "V2"



Variable Body Connections
Type "V3"

CLASS 300

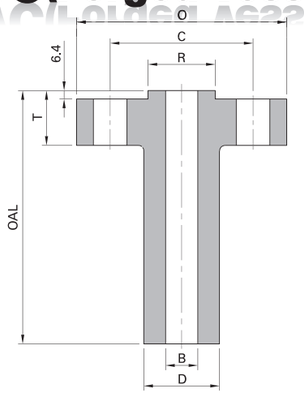
Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
							LWN/F	HB/V
	O	T	R	-	-	C	B	B
1/2	95.3	14.2	35.1	4	15.7	66.5	12.7	14.0
3/4	117.3	15.7	42.9	4	19.1	82.6	19.1	18.8
1	124.0	17.5	50.8	4	19.1	88.9	25.4	24.4
1 3/4	133.4	19.1	63.5	4	19.1	98.6	31.8	32.5
1 1/2	155.4	20.6	73.2	4	22.4	114.3	38.1	38.1
2	165.1	22.4	91.9	8	19.1	127.0	50.8	49.3
2 1/2	190.5	25.4	104.6	8	22.4	149.4	63.5	58.9
3	209.6	28.4	127.0	8	22.4	168.1	76.2	73.7
3 1/2	228.6	30.2	139.7	8	22.4	184.2	88.9	85.3
4	254.0	31.8	157.2	8	22.4	200.2	101.6	97.3
5	279.4	35.1	185.7	8	22.4	235.0	127.0	122.2
6	317.5	36.6	215.9	12	22.4	269.7	152.4	146.3
8	381.0	41.1	269.7	12	25.4	330.2	203.2	193.5
10	444.5	47.8	323.9	16	28.4	387.4	254.0	242.8
12	520.7	50.8	381.0	16	31.8	450.9	304.8	289.1
14	584.2	53.8	412.8	20	31.8	514.4	355.6	355.6
16	647.7	57.2	469.9	20	35.1	571.5	406.4	406.4
18	711.2	60.5	533.4	24	35.1	628.7	457.2	457.2
20	774.7	63.5	584.2	24	35.1	685.8	508.0	508.0
24	914.4	69.9	692.2	24	41.1	812.8	609.6	609.6

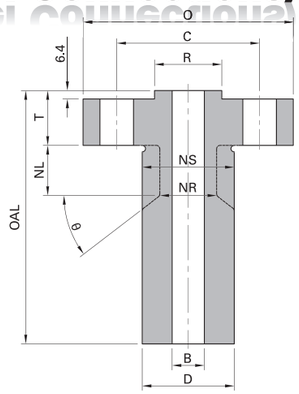
Size	Barrel O.D								
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	38.1	44.5	95.3	-	-	-	44.5	38.1	19.1
3/4	47.8	55.6	117.3	-	-	-	55.6	47.8	22.4
1	53.8	62.0	124.0	69.9	95.3	101.6	62.0	53.8	22.4
1 3/4	63.5	71.4	133.4	-	-	-	71.4	63.5	22.4
1 1/2	69.9	82.6	155.4	101.6	117.3	139.7	82.6	69.9	25.4
2	84.1	100.1	165.1	117.3	139.7	152.4	100.1	84.1	22.4
2 1/2	100.1	117.3	190.5	146.1	152.4	162.1	117.3	100.1	25.4
3	117.3	136.7	209.6	152.4	162.1	177.8	136.7	117.3	25.4
3 1/2	133.4	152.4	228.6	177.8	196.9	209.6	152.4	133.4	25.4
4	146.1	168.1	254.0	177.8	196.9	225.6	168.1	146.1	25.4
5	177.8	203.2	279.4	209.6	225.6	251.0	203.2	177.8	25.4
6	206.2	238.3	317.5	251.0	263.7	279.4	238.3	206.2	25.4
8	260.4	293.6	381.0	307.8	342.9	362.0	293.6	260.4	28.4
10	320.5	345.9	444.5	362.0	384.0	412.8	345.9	320.5	31.8
12	374.7	404.9	520.7	412.8	441.5	463.6	404.9	374.7	35.1
14	425.5	468.4	584.2	492.3	511.0	565.2	468.4	425.5	35.1
16	482.6	520.7	647.7	565.2	590.6	612.6	520.7	482.6	38.1
18	533.4	577.9	711.2	612.6	638.0	679.5	577.9	533.4	38.1
20	587.2	635.0	774.7	679.5	704.9	743.0	635.0	587.2	38.1
24	701.5	752.3	914.4	781.1	812.8	853.9	752.3	701.5	44.5

3) Bolting and Tolerances : FVC flanges are furnished to ASME B16.5 specifications unless otherwise specified
4) Nut Relief : All FVC connections except standard LWN's will be supplied with a "nut stop O.D." unless a "nut relief O.D." is specified.
5) Bore : Bore sizes shown above are standard, other sizes can be furnished upon request.
6) Curving : All FVC connections can be furnished contoured to fit any shell, head or cone at a minimal cost.

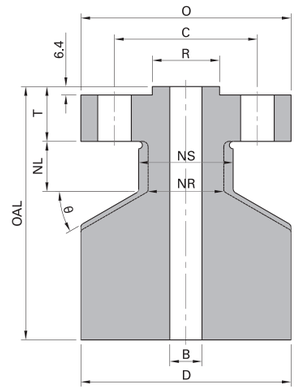
FVC(Forged Vessel Connections)



Long Welding Neck
Type "LWN"



Heavy Barrel Connection
Type "HB"



Full Barrel Connection
Type "F"

CLASS 400

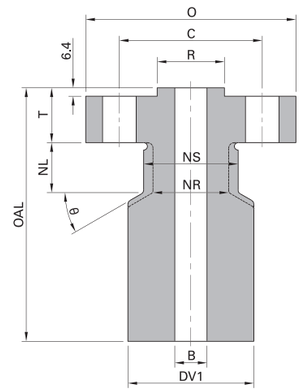
Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
	O	T	R	-	-	C	LWN/F B	HB/V B
1/2	95.3	14.2	35.1	4	15.7	66.5	12.7	14.0
3/4	117.3	15.7	42.9	4	19.1	82.6	19.1	18.8
1	124.0	17.5	50.8	4	19.1	88.9	25.4	24.4
1 1/4	133.4	20.6	63.5	4	19.1	98.6	31.8	32.5
1 1/2	155.4	22.4	73.2	4	22.4	114.3	38.1	38.1
2	165.1	25.4	91.9	8	19.1	127.0	50.8	49.3
2 1/2	190.5	28.4	104.6	8	22.4	149.4	63.5	58.9
3	209.6	31.8	127.0	8	22.4	168.1	76.2	73.7
3 1/2	228.6	35.1	139.7	8	25.4	184.2	88.9	85.3
4	254.0	35.1	157.2	8	25.4	200.2	101.6	97.3
5	279.4	38.1	185.7	8	25.4	235.0	127.0	122.2
6	317.5	41.1	215.9	12	25.4	269.7	152.4	146.3
8	381.0	47.8	269.7	12	28.5	330.2	203.2	193.5
10	444.5	53.8	323.9	16	31.8	387.4	254.0	242.8
12	520.7	57.2	381.0	16	35.1	450.9	304.8	289.1
14	584.2	60.5	412.8	20	35.1	514.4	355.6	355.6
16	647.7	63.5	469.9	20	38.1	571.5	406.4	406.4
18	711.2	66.5	533.4	24	38.1	628.7	457.2	457.2
20	774.7	69.9	584.2	24	41.1	685.8	508.0	508.0
24	914.4	76.2	692.2	24	47.8	812.8	609.6	609.6

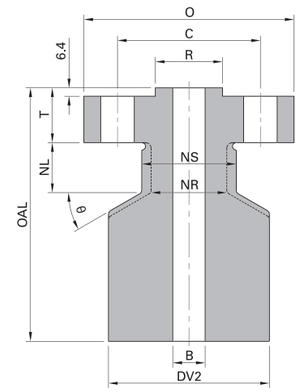
Size	Barrel O.D								
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	38.1	44.5	95.3	-	-	-	44.5	38.1	19.1
3/4	47.8	55.6	117.3	-	-	-	55.6	47.8	22.4
1	53.8	62.0	124.0	69.9	82.6	101.6	62.0	53.8	22.4
1 1/4	63.5	71.4	133.4	-	-	-	71.4	63.5	22.4
1 1/2	69.9	82.6	155.4	101.6	117.3	139.7	82.6	69.9	25.4
2	84.1	100.1	165.1	117.3	139.7	152.4	100.1	84.1	22.4
2 1/2	100.1	117.3	190.5	146.1	152.4	162.1	117.3	100.1	25.4
3	117.3	136.7	209.6	152.4	162.1	177.8	136.7	117.3	25.4
3 1/2	133.4	147.6	228.6	177.8	196.9	209.6	147.6	133.4	28.4
4	146.1	163.6	254.0	177.8	196.9	225.6	163.6	146.1	28.4
5	177.8	198.4	279.4	209.6	225.6	251.0	198.4	177.8	28.4
6	206.2	233.4	317.5	251.0	263.7	279.4	233.4	206.2	28.4
8	260.4	289.1	381.0	307.8	342.9	362.0	289.1	260.4	31.8
10	320.5	341.4	444.5	362.0	384.0	412.8	341.4	320.5	35.1
12	374.7	400.1	520.7	412.8	441.5	463.6	400.1	374.7	38.1
14	425.5	463.6	584.2	492.3	511.0	565.2	463.6	425.5	38.1
16	482.6	515.9	647.7	565.2	590.6	612.6	515.9	482.6	41.1
18	533.4	573.0	711.2	612.6	638.0	679.5	573.0	533.4	41.1
20	587.2	625.6	774.7	679.5	704.9	743.0	625.6	587.2	44.5
24	701.5	743.0	914.4	781.1	812.8	853.9	743.0	701.5	50.8

Notes :

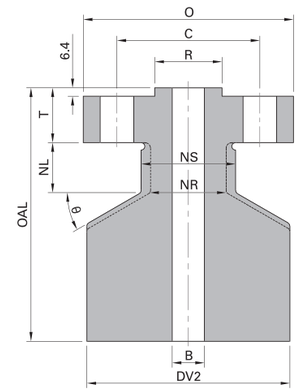
1) Length : The length of all connections includes the barrel, flange and facing. See the current FVC price sheet for standard lengths.
   Intermediate lengths and longer are available upon request.
2) Facing : The FVC flange thickness "T" includes 0.06 inch raised face per ASME B16.5. This differs on Class 400 and above.
   FVC can supply any special facing as needed upon request.



Variable Body Connections
Type "V1"



Variable Body Connections
Type "V2"



Variable Body Connections
Type "V3"

CLASS 600

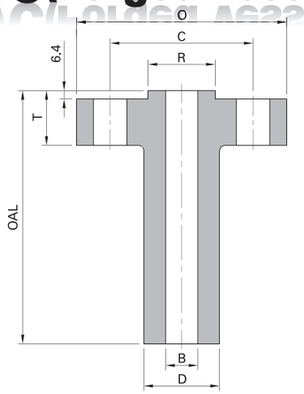
Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
	O	T	R	-	-	C	LWN/F B	HB/V B
1/2	95.3	14.2	35.1	4	15.7	66.5	12.7	14.0
3/4	117.3	15.7	42.9	4	19.1	82.6	19.1	18.8
1	124.0	17.5	50.8	4	19.1	88.9	25.4	24.4
1 3/4	133.4	20.6	63.5	4	19.1	98.6	31.8	32.5
1 1/2	155.4	22.4	73.2	4	22.4	114.3	38.1	38.1
2	165.1	25.4	91.9	8	19.1	127.0	50.8	49.3
2 1/2	190.5	28.4	104.6	8	22.4	149.4	63.5	58.9
3	209.6	31.8	127.0	8	22.4	168.1	76.2	73.7
3 1/2	228.6	35.1	139.7	8	25.4	184.2	88.9	85.3
4	273.1	38.1	157.2	8	25.4	215.9	101.6	97.3
5	330.2	44.5	185.7	8	28.4	266.7	127.0	122.2
6	355.6	47.8	215.9	12	28.4	292.1	152.4	146.3
8	419.1	55.6	269.7	12	31.8	349.3	203.2	193.5
10	508.0	63.5	323.9	16	35.1	431.8	254.0	242.8
12	558.8	66.5	381.0	20	35.1	489.0	304.8	289.1
14	603.3	69.9	412.8	20	38.1	527.1	355.6	355.6
16	685.8	76.2	469.9	20	41.1	603.3	406.4	406.4
18	743.0	82.6	533.4	20	44.5	654.1	457.2	457.2
20	812.8	88.9	584.2	24	44.5	723.9	508.0	508.0
24	939.8	101.6	692.2	24	50.8	838.2	609.6	609.6

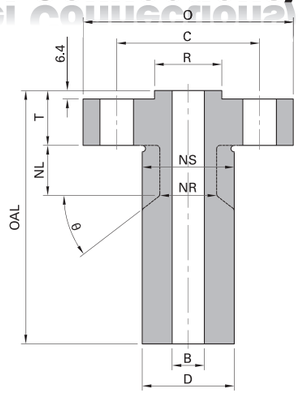
Size	Barrel O.D								
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	38.1	44.5	95.3	-	-	-	44.5	38.1	19.1
3/4	47.8	55.6	117.3	-	-	-	55.6	47.8	22.4
1	53.8	62.0	124.0	82.6	101.6	117.6	62.0	53.8	22.4
1 3/4	63.5	71.4	133.4	-	-	-	71.4	63.5	22.4
1 1/2	69.9	82.6	155.4	101.6	117.3	139.7	82.6	69.9	25.4
2	84.1	100.1	165.1	117.3	139.7	152.4	100.1	84.1	22.4
2 1/2	100.1	117.3	190.5	146.1	162.1	177.8	117.3	100.1	25.4
3	117.3	136.7	209.6	162.1	177.8	196.9	136.7	117.3	25.4
3 1/2	133.4	147.6	228.6	177.8	196.9	209.6	147.6	133.4	28.4
4	152.4	179.3	273.1	196.9	225.6	251.0	179.3	152.4	28.7
5	190.5	225.6	330.2	251.0	279.4	307.8	225.6	190.5	31.8
6	222.3	251.0	355.6	279.4	307.8	336.6	251.0	222.3	31.8
8	273.1	303.3	419.1	336.6	384.0	406.4	303.3	273.1	35.1
10	342.9	381.0	508.0	412.8	441.5	463.6	381.0	342.9	38.1
12	400.1	438.2	558.8	463.6	492.3	511.0	438.2	400.1	38.1
14	431.8	471.4	603.3	492.3	511.0	565.2	471.4	431.8	41.1
16	495.3	543.1	685.8	590.6	612.6	635.0	543.1	495.3	44.5
18	546.1	589.0	743.0	612.6	666.8	704.9	589.0	546.1	47.8
20	609.6	658.9	812.8	704.9	743.0	781.1	658.9	609.6	47.8
24	717.6	763.5	939.8	781.1	812.8	853.9	763.5	717.6	53.8

3) Bolting and Tolerances : FVC flanges are furnished to ASME B16.5 specifications unless otherwise specified.
4) Nut Relief : All FVC connections except standard LWN's will be supplied with a "nut stop O.D." unless a "nut relief O.D." is specified.
5) Bore : Bore sizes shown above are standard, other sizes can be furnished upon request.
6) Curving : All FVC connections can be furnished contoured to fit any shell, head or cone at a minimal cost.

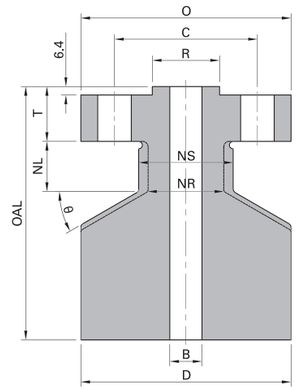
FVC(Forged Vessel Connections)



Long Welding Neck
Type "LWN"



Heavy Barrel Connection
Type "HB"



Full Barrel Connection
Type "F"

CLASS 900

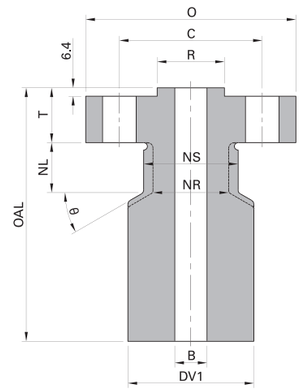
Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
							LWN/F	HB/V
	O	T	R	-	-	C	B	B
1/2	120.7	22.4	35.1	4	22.4	82.6	12.7	14.0
3/4	130.0	25.4	42.9	4	22.4	88.9	19.1	18.8
1	149.4	28.4	50.8	4	25.4	101.6	25.4	24.4
1 1/4	158.8	28.4	63.5	4	25.4	111.3	31.8	32.5
1 1/2	177.8	31.8	73.2	4	28.4	124.0	38.1	38.1
2	215.9	38.1	91.9	8	25.4	165.1	50.8	49.3
2 1/2	244.3	41.1	104.6	8	28.4	190.5	63.5	58.9
3	241.3	38.1	127.0	8	25.4	190.5	76.2	73.7
4	292.1	44.5	157.2	8	31.8	235.0	101.6	97.3
5	349.3	50.8	185.7	8	35.1	279.4	127.0	122.2
6	381.0	55.6	215.9	12	31.8	317.5	152.4	146.3
8	469.9	63.5	269.7	12	38.1	393.7	203.2	193.8
10	546.1	69.9	323.9	16	38.1	469.9	254.0	242.8
12	609.6	79.2	381.0	20	38.1	533.4	304.8	289.1
14	641.4	85.9	412.8	20	41.1	558.8	355.6	355.6
16	704.9	88.9	469.9	20	44.5	616.0	406.4	406.4
18	787.4	101.6	533.4	20	50.8	685.8	457.2	457.2
20	857.3	108.0	584.2	20	53.8	749.3	508.0	508.0
24	1041.4	139.7	692.2	20	66.5	901.7	609.6	609.6

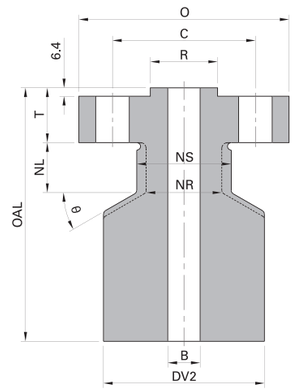
Size	Barrel O.D								
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	39.6	50.8	120.7	-	-	-	50.8	39.6	25.4
3/4	46.0	57.2	130.0	-	-	-	57.2	46.0	25.4
1	53.8	65.0	149.4	82.6	101.6	117.3	65.0	53.8	28.4
1 1/4	63.5	74.7	158.8	-	-	-	74.7	63.5	28.4
1 1/2	69.9	82.6	177.8	101.6	139.7	152.4	82.6	69.9	31.8
2	104.6	128.5	215.9	139.7	152.4	177.8	128.5	104.6	28.4
2 1/2	124.0	149.4	244.3	162.1	177.8	209.6	149.4	124.0	31.8
3	127.0	153.9	241.3	177.8	196.9	209.6	153.9	127.0	28.4
4	158.8	189.0	292.1	225.6	251.0	263.7	189.0	158.8	35.1
5	190.5	228.6	349.3	263.7	279.4	307.8	228.6	190.5	38.1
6	235.0	271.5	381.0	279.4	307.8	342.9	271.5	235.0	35.1
8	298.5	338.1	469.9	384.0	412.8	441.5	338.1	298.5	41.1
10	368.3	414.3	546.1	441.5	463.6	511.0	414.3	368.3	41.1
12	419.1	477.8	609.6	511.0	565.2	590.6	477.8	419.1	41.1
14	450.9	498.3	641.4	565.2	590.6	612.6	498.3	450.9	44.5
16	508.0	550.9	704.9	590.6	635.0	673.1	550.9	508.0	47.8
18	565.2	611.1	787.4	660.4	704.9	743.0	611.1	565.2	53.8
20	622.3	670.1	857.3	704.9	781.1	812.8	670.1	622.3	57.2
24	749.3	803.1	1041.4	853.9	889.0	914.4	803.1	749.3	69.9

Notes :

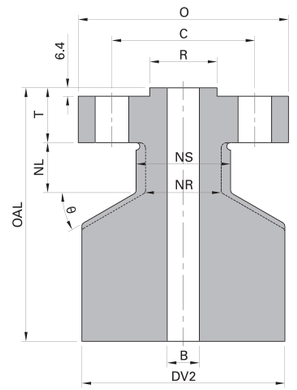
1) Length : The length of all connections includes the barrel, flange and facing. See the current FVC price sheet for standard lengths. Intermediate lengths and longer are available upon request.
2) Facing : The FVC flange thickness "T" includes 0.06 inch raised face per ASME B16.5. This differs on Class 400 and above. FVC can supply any special facing as needed upon request.



Variable Body Connections
Type "V1"



Variable Body Connections
Type "V2"



Variable Body Connections
Type "V3"

CLASS 1500

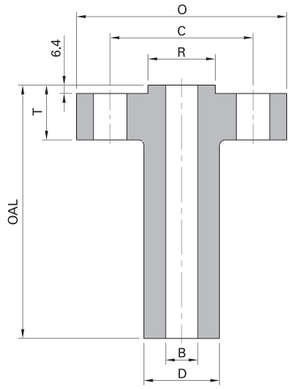
Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
							LWN/F	HB/V
	O	T	R	-	-	C	B	B
1/2	120.7	22.4	35.1	4	22.4	82.6	12.7	14.0
3/4	130.0	25.4	42.9	4	22.4	88.9	19.1	18.8
1	149.4	28.4	50.8	4	25.4	101.6	25.4	24.4
1 1/4	158.8	28.4	63.5	4	25.4	111.3	31.8	32.5
1 1/2	177.8	31.8	73.2	4	28.4	124.0	38.1	38.1
2	215.9	38.1	91.9	8	25.4	165.1	50.8	49.3
2 1/2	244.3	41.1	104.6	8	28.4	190.5	63.5	58.9
3	266.7	47.8	127.0	8	31.8	203.2	76.2	73.7
4	311.2	53.8	157.2	8	35.1	241.3	101.6	97.3
5	374.7	73.2	185.7	8	41.1	292.1	127.0	122.2
6	393.7	82.6	215.9	12	38.1	317.5	152.4	146.3
8	482.6	91.9	269.7	12	44.5	393.7	203.2	193.5
10	584.2	108.0	323.9	12	50.8	482.6	254.0	242.8
12	673.1	124.0	381.0	16	53.8	571.5	304.8	289.1
14	749.3	133.4	412.8	16	60.5	635.0	355.6	355.6
16	825.5	146.1	469.9	16	66.5	704.9	406.4	406.4
18	914.4	162.1	533.4	16	73.2	774.7	457.2	457.2
20	984.3	177.8	584.2	16	79.2	831.9	508.0	508.0
24	1168.4	203.2	692.2	16	91.9	990.6	609.6	609.6

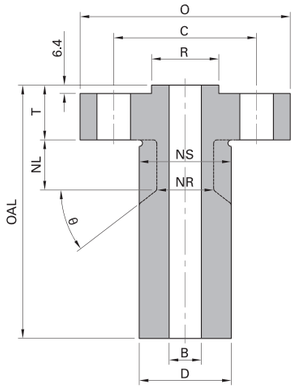
Size	Barrel O.D								
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	39.6	50.8	120.7	-	-	-	50.8	39.6	25.4
3/4	46.0	57.2	130.0	-	-	-	57.2	46.0	25.4
1	53.8	65.0	149.4	82.6	101.6	117.3	65.0	53.8	28.4
1 1/4	63.5	74.7	158.8	-	-	-	74.7	63.5	28.4
1 1/2	69.9	82.6	177.8	117.3	139.7	152.4	82.6	69.9	31.8
2	104.6	128.5	215.9	139.7	152.4	177.8	128.5	104.6	28.4
2 1/2	124.0	149.4	244.3	162.1	177.8	209.6	149.4	124.0	31.8
3	133.4	157.2	266.7	177.8	196.9	225.6	157.2	133.4	35.1
4	162.1	190.5	311.2	225.6	251.0	279.4	190.5	162.1	38.1
5	196.9	231.6	374.7	263.7	307.8	342.9	231.6	196.9	44.5
6	228.6	261.9	393.7	307.8	342.9	362.0	261.9	228.6	41.1
8	292.1	328.7	482.6	384.0	412.8	441.5	328.7	292.1	47.8
10	368.3	407.9	584.2	441.5	511.0	565.2	407.9	368.3	53.8
12	450.9	492.3	673.1	565.2	590.6	612.6	492.3	450.9	57.2
14	495.3	546.1	749.3	590.6	635.0	704.9	546.1	495.3	63.5
16	552.5	606.6	825.5	666.8	743.0	781.1	606.6	552.5	69.9
18	596.9	666.8	914.4	704.9	781.1	853.9	666.8	596.9	76.2
20	641.4	714.2	984.3	781.1	838.2	914.4	714.2	641.4	82.6
24	762.0	853.9	1168.4	914.4	952.5	1028.7	853.9	762.0	95.3

3) Bolting and Tolerances : FVC flanges are furnished to ASME B16.5 specifications unless otherwise specified.
4) Nut Relief : All FVC connections except standard LWN's will be supplied with a "nut stop O.D." unless a "nut relief O.D." is specified.
5) Bore : Bore sizes shown above are standard, other sizes can be furnished upon request.
6) Curving : All FVC connections can be furnished contoured to fit any shell, head or cone at a minimal cost.

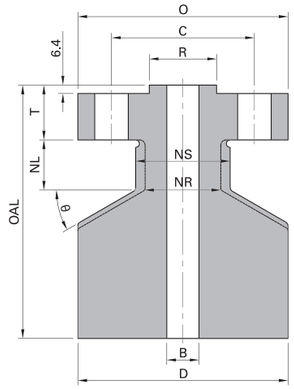
FVC(Forged Vessel Connections)



Long Welding Neck
Type "LWN"



Heavy Barrel Connection
Type "HB"



Full Barrel Connection
Type "F"

CLASS 2500

Unit : mm

Size	Flange O.D	Flange Thick	RF O.D	Bolt Holes	Hole Size	Bolt Circle	Bore	
							LWN/F	HB/V
	O	T	R	-	-	C	B	B
1/2	133.4	30.2	35.1	4	22.4	88.9	12.7	14.0
3/4	139.7	31.8	42.9	4	22.4	95.3	19.1	18.8
1	158.8	35.1	50.8	4	25.4	108.0	25.4	24.4
1 1/4	184.2	38.1	63.5	4	28.4	130.0	31.8	32.5
1 1/2	203.2	44.5	73.2	4	31.8	146.1	38.1	38.1
2	235.0	50.8	91.9	8	28.4	171.5	50.8	49.3
2 1/2	266.7	57.2	104.6	8	31.8	196.9	63.5	58.9
3	304.8	66.5	127.0	8	35.1	228.6	76.2	73.7
4	355.6	76.2	157.2	8	41.1	273.1	101.6	97.3
5	419.1	91.9	185.7	8	47.8	323.9	127.0	122.2
6	482.6	108.0	215.9	8	53.8	368.3	152.4	146.3
8	552.5	127.0	269.7	12	53.8	438.2	203.2	193.8
10	673.1	165.1	323.9	12	66.5	539.8	254.0	242.8
12	762.0	184.2	381.0	12	73.2	619.3	304.8	289.1

Size	Barrel O.D								
	LWN	HB	F	V1	V2	V3	Nut Stop Dia.	Nut Relief Dia.	Nut Relief Lugth.
	D	D	D	DV1	DV2	DV3	NS	NR	NL
1/2	46.0	57.2	133.4	0.0	0.0	0.0	57.2	46.0	25.4
3/4	52.3	63.5	139.7	0.0	0.0	0.0	63.5	52.3	25.4
1	57.2	71.4	158.8	101.6	117.3	139.7	71.4	57.2	28.4
1 1/4	73.2	88.9	184.2	0.0	0.0	0.0	88.9	73.2	31.8
1 1/2	79.2	100.1	203.2	139.7	152.4	177.8	100.1	79.2	35.1
2	95.3	130.0	235.0	152.4	177.8	203.2	130.0	95.3	31.8
2 1/2	114.3	150.9	266.7	177.8	196.9	225.6	150.9	114.3	35.1
3	133.4	177.8	304.8	209.6	251.0	279.4	177.8	133.4	38.1
4	165.1	212.9	355.6	251.0	279.4	307.8	212.9	165.1	44.5
5	203.2	254.0	419.1	279.4	342.9	387.4	254.0	203.2	50.8
6	235.0	289.1	482.6	342.9	384.0	441.5	289.1	235.0	57.2
8	304.8	358.6	552.5	384.0	463.6	511.0	358.6	304.8	57.2
10	374.7	441.5	673.1	511.0	565.2	612.6	441.5	374.7	69.9
12	441.5	511.0	762.0	565.2	635.0	704.9	511.0	441.5	76.2

Notes :

1) Length : The length of all connections includes the barrel, flange and facing. See the current FVC price sheet for standard lengths. Intermediate lengths and longer are available upon request.
2) Facing : The FVC flange thickness “T” includes 0.06 inch raised face per ASME B16.5. This differs on Class 400 and above. FVC can supply any special facing as needed upon request.
3) Bolting and Tolerances : FVC flanges are furnished to ASME B16.5 specifications unless otherwise specified.
4) Nut Relief : All FVC connections except standard LWN's will be supplied with a “nut stop O.D.” unless a “nut relief O.D.” is specified.
5) Bore : Bore sizes shown above are standard, other sizes can be furnished upon request.
6) Curving : All FVC connections can be furnished contoured to fit any shell, head or cone at a minimal cost.

ASME B16.36-1996
ORIFICE FLANGES

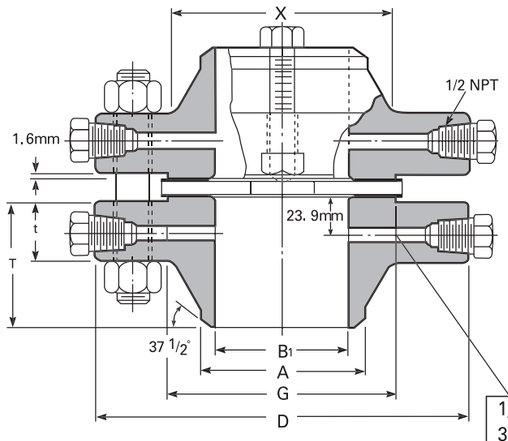






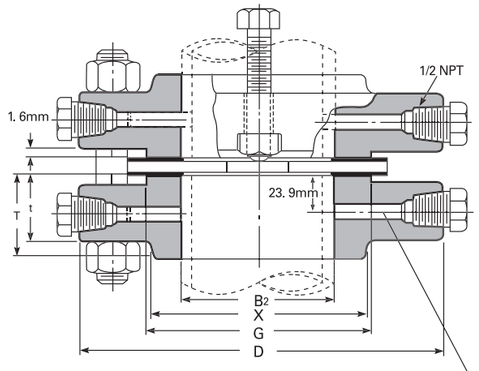
CLASS 300 FLANGES

WELDING NECK (RAISED FACE)

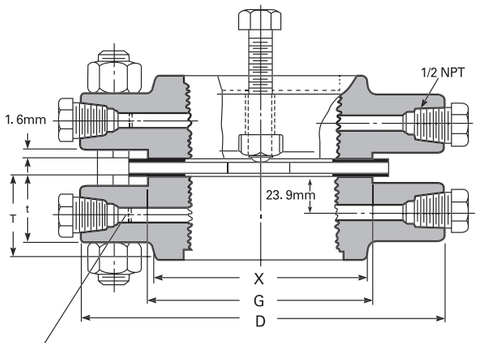


1/4" Drill for Sizes 2 1/2" and Under
3/8" Drill for Sizes 3"
1/2" Drill for Sizes 4" and Over

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

ASME 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)	
						Welding Neck	Slip-on& Threaded	Welding Neck	Slip-on
	D	Raised Face	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
8	584	53.8	425.5	412.8	355.6	142.7	76.2	336.6	359.2
10	648	57.2	482.6	469.9	406.4	146.1	82.6	387.4	410.5
12	711	60.5	533.4	533.4	457.2	158.8	88.9	438.2	461.8
20	755	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

Unit : mm

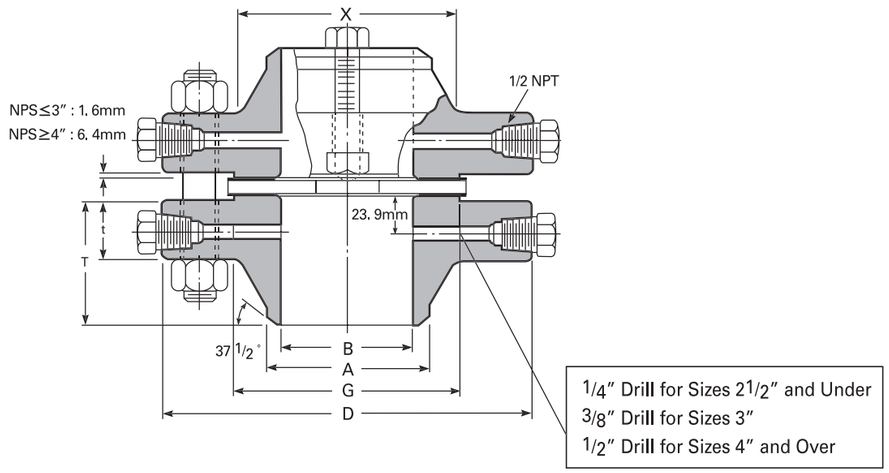
Nominal Pipe Size	Pitch Diam.of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT	JACK SCREW SIZE	DRILLING TEMPLATE				
					Diam.of Bolt Circle	Number of Holes	Diam.of Stud Bolts (inch)	Diam.of Bolt Holes	Length of Stud Bolts
	P		Raised Face	Raised Face					Raised Face
1	50.8	R16	9.7	Jack screw size for 1" thru 24" are those shown for length and diameter of bolts.	88.9	4	5/8	17.5	139.7
1 1/4	60.3	R18	9.7		98.6	4	5/8	17.5	152.4
1 1/2	68.3	R20	12.7		114.3	4	3/4	20.6	152.4
2	82.6	R23	9.7		127.0	8	5/8	17.5	152.4
2 1/2	101.6	R26	12.7		149.4	8	3/4	20.6	152.4
3	123.8	R31	12.7		168.1	8	3/4	20.6	152.4
4	149.2	R37	12.7		200.2	8	3/4	20.6	152.4
5	181.0	R41	12.7		235.0	8	3/4	22.4	152.4
6	211.1	R45	12.7		269.7	8	3/4	22.4	152.4
8	269.9	R49	15.7		330.2	12	7/8	25.4	158.8
10	323.9	R53	19.1		387.4	16	1	28.4	165.1
12	381.0	R57	22.4		450.9	16	1 1/8	31.8	177.8
8	419.1	R61	22.4		541.4	20	1 1/8	31.8	184.2
10	469.9	R65	25.4		571.5	20	1 1/4	35.1	196.9
12	533.4	R69	25.4		628.7	24	1 1/4	35.1	203.2
20	584.2	R73	25.4		685.8	24	1 1/4	35.1	215.9
24	692.2	R77	31.8		812.8	24	1 1/2	41.1	241.3

Notes :

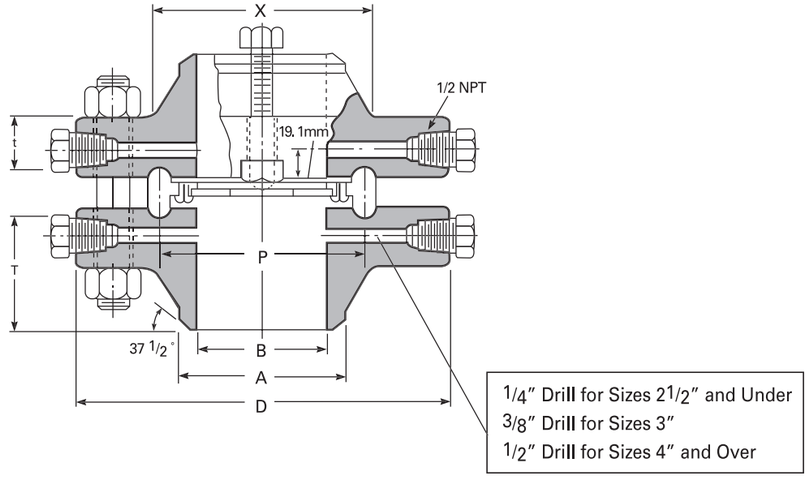
(1) For the 'Bore' (B) of Welding Neck Flanges other than Standard Wall Thickness, refer to 54-55.
(2) Class 300 Welding Neck Flanges of size 24 "(609.6mm) and smaller will be bored to match Standard Wall Pipe unless otherwise specified.
(3) Class 300 Orifice flanges will be furnished with 0.06"(1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub'(T)
(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 NPS 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 FLANGES

WELDING NECK (RAISED FACE)



WELDING NECK (RING-JOINT TYPE)



ASME 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)	
							Welding Neck		Slip-on& Threaded		Welding Neck	Slip-on
	D	Raised Face	Ring Joint	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	79.8	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	31.8	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
8	584	60.7	60.5	425.5	412.8	355.6	149.4	149.4				359.2
10	648	63.5	63.5	482.6	469.9	406.4	152.4	152.4				410.5
12	711	66.5	66.5	533.4	533.4	457.2	165.1	165.1				461.8
20	755	69.9	69.9	587.2	584.2	508.0	168.1	168.1				513.1
24	914	76.2	76.2	701.2	692.2	609.6	174.8	174.8				564.4

Notes :

(1) For the inside diameter of pipes (corresponding to 'Bore' (B) of Welding Neck Flanges), refer to page 54-55.
(2) Class 400 Flanges of sizes 3"(76.2mm) and smaller will be furnished with 0.06"(1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub'(T)
(3) Each union includes two carbon steel jack screw bolts with hex nuts.

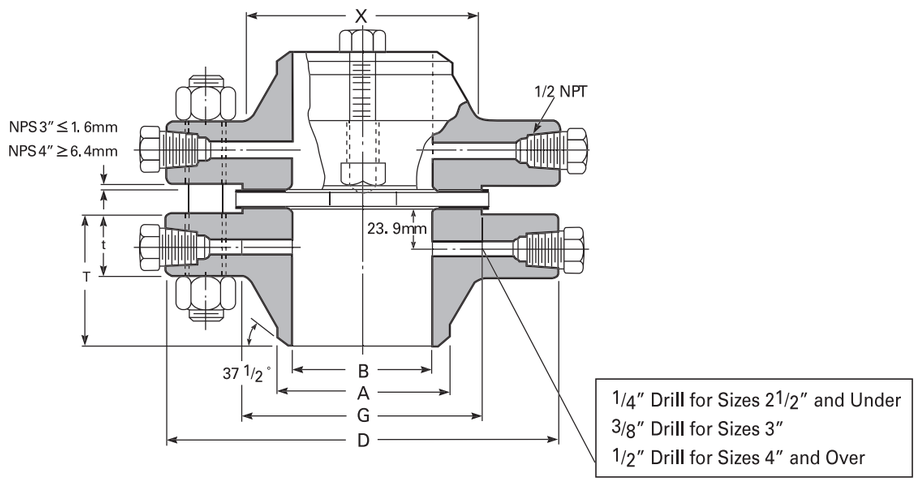
Unit : mm

Nominal Pipe Size	Pitch Diam.of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT		JACK SCREW SIZE		DRILLING TEMPLATE					
											Length of Stud Bolts	
	P		Raised Face	Ring Joint	Raised Face (inch)	Ring Joint (inch)	Diam.of Bolt Circle	Number of Holes	Diam.of Stud Bolts (inch)	Diam.of Bolt Holes	Raised Face	Ring Joint
1	50.8	R16	9.7	6.4	5/8 x 4.00	5/8 x 4.75	88.9	4	5/8	17.5	127.0	146.1
1 1/4	60.3	R18	9.7	6.4	5/8 x 4.00	5/8 x 4.75	98.6	4	5/8	17.5	127.0	120.7
1 1/2	68.3	R20	12.7	6.4	3/4 x 4.25	3/4 x 5.00	114.3	4	3/4	21.0	133.4	152.4
2	82.6	R23	9.7	6.4	5/8 x 4.00	5/8 x 4.75	127.0	8	5/8	17.5	127.0	152.4
2 1/2	101.6	R26	12.7	6.4	3/4 x 4.25	3/4 x 5.00	149.4	8	3/4	20.6	133.4	158.8
3	123.8	R31	12.7	6.4	3/4 x 4.25	3/4 x 5.00	168.1	8	3/4	20.6	133.4	158.8
4	149.2	R37	6.4	15.7	3/4 x 3.00	3/4 x 4.00	200.2	8	7/8	25.4	139.7	152.4
5	181.0	R41	6.4	15.7	3/4 x 3.00	3/4 x 4.00	235.0	8	7/8	25.4	146.1	158.8
6	211.1	R45	12.7	22.4	1 x 3.50	1 x 4.00	269.7	12	7/8	25.4	158.8	165.1
8	269.9	R49	12.7	22.4	1 x 3.50	1 x 4.50	330.2	12	1	28.4	171.5	184.2
10	323.9	R53	12.7	22.4	1 x 4.00	1 x 4.50	387.4	16	1 1/8	31.8	190.5	203.2
12	381.0	R57	12.7	22.4	1 x 4.00	1 x 5.00	450.9	16	1 1/4	35.1	203.2	215.9
8	419.1	R61	12.7	22.4	1 x 4.25	1 x 5.00	514.4	20	1 1/4	35.1	209.6	228.6
10	469.9	R65	12.7	22.4	1 x 4.25	1 x 5.00	571.5	20	1 3/8	38.1	222.3	235.0
12	533.4	R69	12.7	22.4	1 x 4.50	1 x 5.00	628.7	24	1 3/8	38.1	235.0	241.3
20	584.2	R73	12.7	22.4	1 x 4.75	1 x 5.50	685.8	24	1 1/2	41.1	247.7	260.4
24	692.2	R77	12.7	22.4	1 x 5.00	1 x 6.00	812.8	24	1 3/4	47.8	279.4	285.8

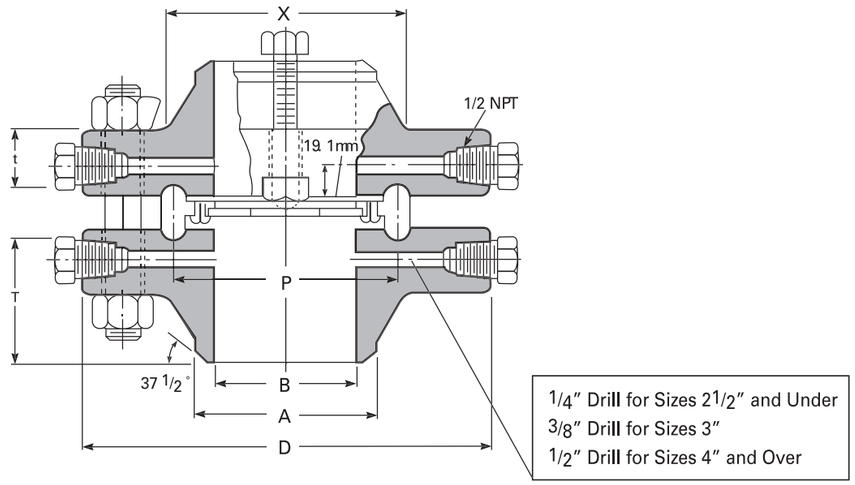
(4) Unless otherwise specified, raised face union are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
(5) On ring joint flanges having a groove depth 0.375"(9.5mm) and less, the distance from the center line of the tap hole to the 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 NPS 4-12 and 0.38"(9.7mm) for NPS 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62"(15.7mm) for NPS 4-10, 0.75"(19.1mm) for NPS 12-18 and 0.88"(22.4mm) for NPS 20.

CLASS 600 FLANGES

WELDING NECK (RAISED FACE)



WELDING NECK (RING-JOINT TYPE)



ASME 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)	
							Welding Neck		Slip-on& Threaded		Welding Neck	Slip-on
	D	Raised Face	Ring Joint	X	G	A	Raised Face	Ring Joint	Raised Face	Ring Joint		
1	124	38.1	38.1	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	38.1	63.5	63.5	42.2	84.1	77.7	46.0	39.6		43.2
1 1/2	155	38.1	38.1	69.9	73.2	48.3	85.9	79.2	47.8	41.1		49.5
2	165	38.1	38.1	84.1	91.9	60.5	85.9	79.2	49.3	42.9		62.0
2 1/2	191	38.1	38.1	100.1	104.6	73.2	88.9	82.6	50.8	44.5		74.7
3	210	38.1	38.1	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
8	603	69.9	69.9	431.8	412.8	355.6	165.1	165.1				
10	686	76.2	76.2	495.3	469.9	406.4	177.8	177.8				
12	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'(B) of Welding Neck Flanges), reger to page 54-55.
(2) Class 600 Flanges of sizes 3"(76.2mm) 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 size 4"(101.6mm) and larger is not included in (t) and (T).
(3) Each union includes two carbon steel jack screw bolts with hex nuts.

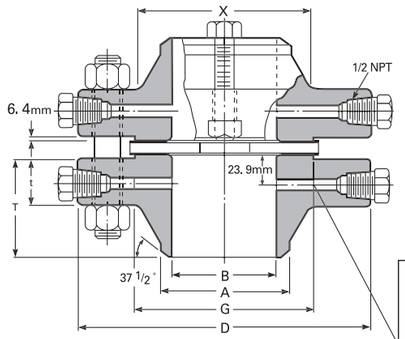
Unit : mm

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 Holes	Diam.of Stud Bolts (inch)	Diam.of Bolt Holes		Length of Stud Bolts	
	P									RF	RTJ	Raised Face	Ring Joint
1	50.8	R16	9.7	6.4	5/8 x 4.00	5/8 x 4.75	88.9	4	5/8	17.5	19.1	127.0	146.1
1 1/4	60.3	R18	9.7	6.4	5/8 x 4.00	5/8 x 4.75	98.6	4	5/8	17.5	-	127.0	146.1
1 1/2	68.3	R20	12.7	6.4	3/4 x 4.25	3/4 x 5.00	114.3	4	3/4	20.6	22.4	133.4	152.4
2	82.6	R23	9.7	6.4	5/8 x 4.00	5/8 x 4.75	127.0	8	5/8	17.5	19.7	127.0	152.4
2 1/2	101.6	R26	12.7	6.4	3/4 x 4.25	3/4 x 5.00	149.4	8	3/4	20.6	22.4	133.4	158.8
3	123.8	R31	12.7	6.4	3/4 x 4.25	3/4 x 5.00	168.1	8	3/4	20.6	22.4	133.4	158.8
4	149.2	R37	6.4	15.7	3/4 x 3.00	3/4 x 4.00	215.9	8	7/8	25.4	25.4	152.4	165.1
5	181.0	R41	6.4	15.7	3/4 x 3.00	3/4 x 4.50	266.7	8	1	28.4	28.4	139.7	117.8
6	211.1	R45	12.7	22.4	1 x 3.50	1 x 4.50	292.1	12	1	28.4	28.4	177.8	190.5
8	269.9	R49	12.7	22.4	1 x 4.00	1 x 4.75	349.3	12	1 1/8	31.8	31.8	196.9	209.6
10	323.9	R53	12.7	22.4	1 x 4.00	1 x 5.00	431.8	16	1 1/4	35.1	35.1	222.3	235.0
12	381.0	R57	12.7	22.4	1 x 4.50	1 x 5.00	489.0	20	1 1/4	35.1	35.1	228.6	241.3
8	419.1	R61	12.7	22.4	1 x 5.00	1 x 5.50	527.1	20	1 3/8	38.1	38.1	241.3	254.0
10	469.9	R65	12.7	22.4	1 x 5.00	1 x 5.50	603.3	20	1 1/2	41.1	41.4	260.4	273.1
12	533.4	R69	12.7	22.4	1 x 5.00	1 x 5.75	654.1	20	1 5/8	44.5	44.5	279.4	292.1
20	584.2	R73	12.7	22.4	1 x 6.00	1 x 6.25	723.9	24	1 5/8	44.5	44.5	298.5	317.5
24	692.2	R77	12.7	22.4	1 x 6.00	1 x 7.00	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 NPS 1-12 and 0.38"(9.7mm) for NPS 14-24. Bolt lengths for ring type joint flanges included allowance of 0.62"(15.7mm) for NPS 1-10, 0.75"(19.1mm) for NPS 12-18 and 0.88"(22.4mm) for NPS 20.
(5) Unless otherwise specified, raised face union 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.

CLASS 900-1500 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

ASME B16.36 FORGED FLANGES

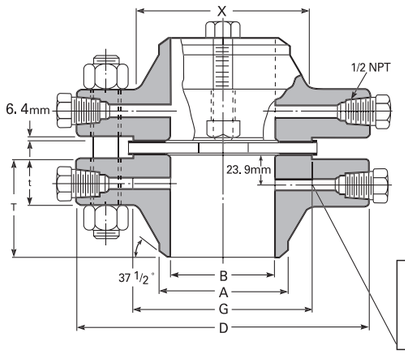
Unit : mm

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)	
							Welding Neck		Slip-on& Threaded		Welding Neck	Slip-on
	D	Raised Face	Ring Joint	X	G	A	Raised Face	Ring Joint	Raised Face	Ring Joint		
CLASS 900												
3	341	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) of Wilding Neck Flanges), refer to page 54-55.
(2) Class 900 dimensions of size 1"(25.4mm) through 2½" 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-JOINT TYPE)



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

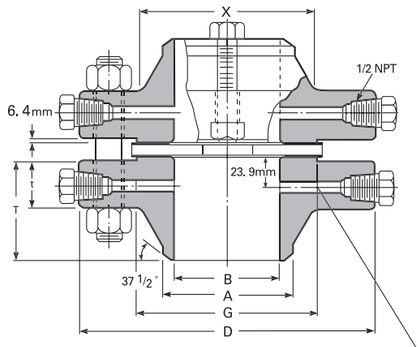
Unit : mm

Nominal Pipe Size	Pitch Diam.of Ring and Groove	Ring Number	DEPTH OF JACK SCREW SLOT		JACK SCREW SIZE		DRILLING TEMPALTE					
											Length of Stud Bolts	
	P		Raised Face	Ring Joint	Raised Face (inch)	Ring Joint (inch)	Diam.of Bolt Circle	Number of Bolt	Diam.of Stud Bolts (inch)	Diam.of Bolt Holes	Raised Face	Ring Joint
CLASS 900												
3	123.8	R31	9.7	15.7	3/4 x 3.50	3/4 x 4.00	190.5	8	7/8	25.4	152.4	165.1
4	149.2	R37	9.7	15.7	3/4 x 3.50	3/4 x 4.50	235.0	8	1 1/8	31.8	177.8	190.5
5	181.0	R41	9.7	15.7	3/4 x 3.50	3/4 x 4.50	279.4	8	1 1/4	35.1	190.5	203.2
6	211.1	R45	15.7	22.4	1 x 4.50	1 x 4.75	317.5	12	1 1/8	31.8	196.9	209.6
8	269.9	R49	15.7	22.4	1 x 4.50	1 x 5.50	393.7	12	1 3/8	38.1	228.6	241.3
10	323.9	R53	15.7	22.4	1 x 4.50	1 x 5.25	469.9	16	1 3/8	38.1	241.3	254.0
12	381.0	R57	15.7	22.4	1 x 4.50	1 x 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	R16	6.4	12.7	5/8 x 3.00	5/8 x 3.50	101.6	4	7/8	25.4	152.4	158.8
1 1/4	60.3	R18	6.4	12.7	5/8 x 3.00	5/8 x 3.50	111.3	4	7/8	25.4	139.7	146.1
1 1/2	68.3	R20	6.4	12.7	5/8 x 3.00	5/8 x 3.50	124.0	4	1	28.4	158.8	165.1
2	95.3	R24	6.4	12.7	5/8 x 3.00	5/8 x 4.00	165.1	8	1 7/8	25.4	152.4	165.1
2 1/2	108.0	R27	6.4	12.7	5/8 x 3.00	5/8 x 4.00	190.5	8	1	28.4	165.1	177.8
3	136.5	R35	9.7	15.7	5/8 x 3.50	3/4 x 4.00	203.2	8	1 1/8	31.8	184.2	196.9
4	161.9	R39	9.7	15.7	3/4 x 3.50	3/4 x 4.50	241.3	8	1 1/4	35.1	203.2	215.9
5	193.7	R44	9.7	15.7	3/4 x 3.50	3/4 x 4.50	292.1	8	1 1/2	41.1	247.7	260.4
6	211.1	R46	15.8	22.4	1 x 6.00	1 x 6.50	317.5	12	1 3/8	38.1	266.7	279.4
8	269.9	R50	15.7	22.4	1 x 6.50	1 x 6.50	393.7	12	1 5/8	44.5	298.5	317.5
10	323.9	R54	15.7	22.4	1 x 6.50	1 x 7.00	482.6	12	1 7/8	50.8	342.9	362.0
12	381.0	R58	15.7	22.4	1 x 6.50	1 x 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	

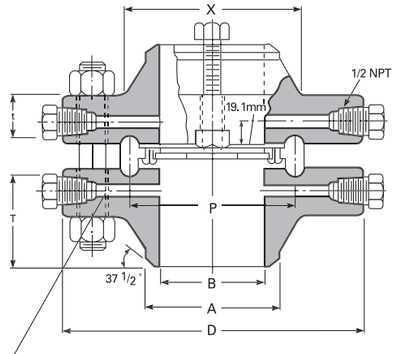
(5) Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
(6) ON ring joint flanges having a groove depth 0.375"(9.5mm)and less, the distance from the center line of the tap hole to the 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.
(7) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25"(6.4mm) for NPS 3-12(#900), 1-12(#1500) and 0.38" (9.7mm) for NPS 14-24(#900, #1500). Bolt lengths for ring type joint flanges include. Allowance of 0.62 in (15.7mm) for NPS 3-10(#900). NPS 1-6(#1500) and 0.75 in (19.1mm) for NPS 12 (#900)

CLASS 2500 FLANGES

WELDING NECK (RAISED FACE)



WELDING NECK (RING-JOINT TYPE)



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

ASME B16.36 FORGED FLANGES

Unit : mm

Nominal Pipe Size	O.D.of Flange Face	O.D.of Raised Flange	Thick-ness of Flange	Length Thru	Diam.of Hub	Diam.of Hub at Bevel	Bore	Ring Joint Type Pitch Daim	Ring Number	DRILLING TEMPLATE					
										Diam. Bolt Circle	Number of Holes	Diam.of Holes	Dianm. of Bolt (inch)	Length of Stud Bolts Raised Face	Length of Stud Bolts Ring Joint
	D	G	t	T	X	A	B	P							
1	159	50.8	38.1	91.9	57.2	33.5	See Note(1) To be specified by purchaser	60.3	R18	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	R23	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	R26	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	R28	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	R32	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) of Welding Neck Flange), refer to page 54-55.
(2) Class 2500 flanges will be furnished with 0.25"(6.24mm) 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 ASME B16.5.
(7) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25"(6.4mm) for NPS 1-12. Bolt lengths for ring type joint flanges include allowance of 0.62"(15.7mm) for NPS 1-3.

ASME ORIFICE FLANGE (ASME B 16.36-1996) FORGED-FLANGES

ORIFICE FLANGES are widely used in conjunction with orifice meters for measuring the rate of fl ow of liquids and gases. They are basically the same as standard welding neck, slip-on and screwed flanges expect for rhe 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) Location
Each fl ange shall have a machine bolt mounted in a hole drilled on the flange center line at 90 deg. From the pressure taps, for use as a jack screw. Machine bolt shall be regular with one heavy hex nut.
2) Solt for Nut
A solt 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.
3) Tapped Hole
A tapped hole may be provided and the hex nut omitted when agreed on between the purchaser and the manufacturer.

2. PRESSURE TAPS

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.
1) Location
The 0.94 in.(23.9mm) locating dimension for raised face and 0.75 in.(19.1mm) for ring joint shall be measured at the bore.
2) Each pressure tap hole shall be equipped with a pipe plug.

3. FACING

The finish of contact faces shall conform to the requirement of ASME B16.5

4. FLANGE THREADS

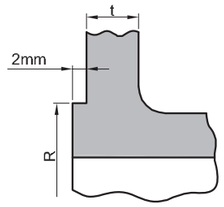
Threaded flanges shall have an American National Standard taper pipe thread conforming to ASME B1.20.1
1) The thread shall be concentric with the axis of the flange. Variations in alignment shall not exceed 0.06 in./ft. (0.5%).
2) The flanges are made with counterbores at the back of the flange and the threads shall be chamfered to the diameter of the counterbore at an angle of approximately 45 deg. with the axis of the thread to afford easy entrance in making a joint. The counterbore and chamfer shall be concentric with the thread.
3) 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 the face of the flange.
4) 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 one-half (1/2)the pitch of the thread
5) The maximum allowable thread variation is one turn large or small from the gaging notch.

5. TOLERANCES

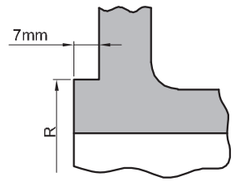
Tolerances on all dimensions shall be as shown in ASME B16.5 except for those shown below.
1) Pressure Tap Location.
Tolerance on location of center of pressure tap hole from flange face shall be :
(a) flanges smaller than NPS 4, ±0.02 in.(0.51mm)
(b) flanges NPS 4 and larger, ±0.03 in.(0.76mm)
2) Bore Diameter
Bore diameter tolerance (welding neck flanges only) is ±0.5% of nominal value.

FLANGES FACINGS

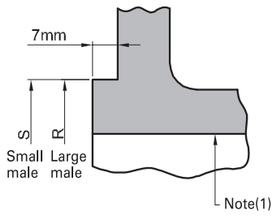
2mm raised face regularly furnished on Classes 150 and 300 unless otherwise ordered



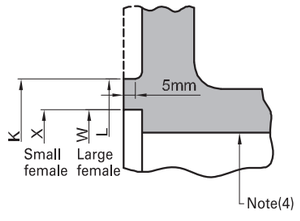
7mm raised face regularly furnished on Classes 400 and higher unless otherwise ordered



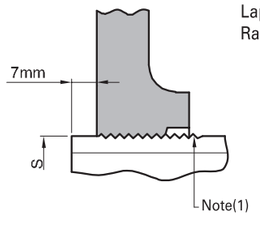
Large or small male face [Note (2)]



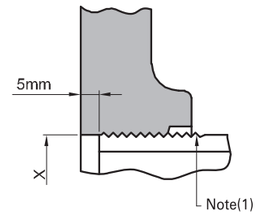
Large or small female face [Note (2)]



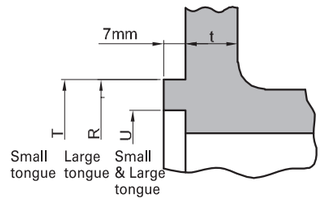
Small male face (on end of pipe)



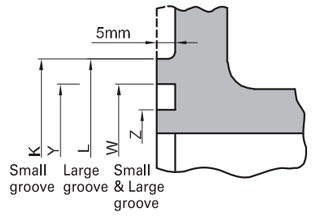
Small female face (on end of pipe)



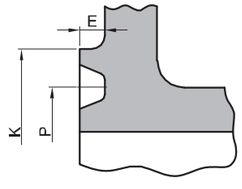
Large or small tongue face [Note (2)]



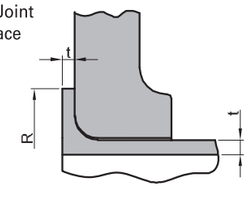
Large or small groove face [Note (2)]



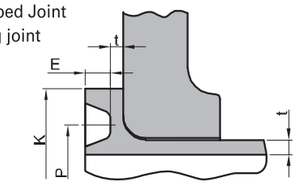
Ring joint face



Lapped Joint Raised face



Lapped Joint Ring joint



ASME B16.36 FORGED FLANGES

Unit : mm

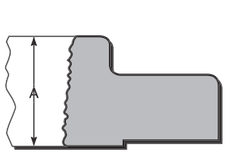
Nominal Pip Size	OUTSIDE DIAMETER			Inside Diameter of Large and Small Tongue	OUTSIDE DIAMETER			Inside Diameter of Large and Small Groove	HEIGHT		Depth of Groove or Female	MIN. OUTSIDE DIAMETER OF RAISED PORTION		Norminal Pipe Size
	Raised Face, Lapped, Large Male &Lagre Tongue	Small Male	Small Tongue		Large Female & Large Groove	Small Female	Small Groove		Raised Face and 300 ST'DS	Large& Small Male and Tongue Class 400 ~2500		Small Female& Groove	Large Female& Groove	
	R	S	T	U	W	X	Y	Z				K	L	
1/2	34.9	18.3	35.1	25.4	36.5	19.9	36.5	23.8	2.0	7.0	5.0	44	46	1/2
3/4	42.9	23.8	42.9	33.3	44.4	25.4	44.4	31.8	2.0	7.0	5.0	52	54	3/4
1	50.8	30.2	47.8	38.1	52.4	31.8	49.2	36.5	2.0	7.0	5.0	57	62	1
1 1/4	63.5	38.1	57.2	47.6	65.1	39.7	58.7	46.0	2.0	7.0	5.0	67	75	1 1/4
1 1/2	73.0	44.4	63.5	54.0	74.6	46.0	65.1	52.4	2.0	7.0	5.0	73	84	1 1/2
2	92.1	57.2	82.6	73.0	93.7	58.8	84.1	71.4	2.0	7.0	5.0	92	103	2
2 1/2	104.8	68.3	95.2	85.7	106.4	69.8	96.8	84.1	2.0	7.0	5.0	105	116	2 1/2
3	127.0	84.1	117.5	108.0	128.6	85.7	119.1	106.4	2.0	7.0	5.0	127	138	3
3 1/2	139.7	96.8	130.2	120.6	141.3	98.4	131.8	119.1	2.0	7.0	5.0	140	151	3 1/2
4	157.2	109.5	144.5	131.8	158.8	111.1	146.0	130.2	2.0	7.0	5.0	157	168	4
5	185.7	136.5	173.0	160.3	187.3	138.1	174.6	158.8	2.0	7.0	5.0	186	197	5
6	215.9	161.9	203.2	190.5	217.5	163.5	204.8	188.9	2.0	7.0	5.0	216	227	6
8	269.9	212.7	254.0	238.1	271.5	214.3	255.6	236.5	2.0	7.0	5.0	270	281	8
10	323.8	266.7	304.8	285.8	325.4	268.3	306.4	284.2	2.0	7.0	5.0	324	335	10
12	381.0	317.5	362.0	342.9	382.6	319.1	363.5	341.3	2.0	7.0	5.0	381	392	12
14	412.8	349.2	393.7	374.6	414.3	350.8	395.3	373.1	2.0	7.0	5.0	413	424	14
16	469.9	400.0	447.5	425.4	471.5	401.6	449.3	423.9	2.0	7.0	5.0	470	481	16
18	533.4	450.8	511.2	489.0	535.0	452.4	512.8	487.4	2.0	7.0	5.0	533	544	18
20	584.2	501.6	558.8	533.4	585.8	503.2	560.4	531.8	2.0	7.0	5.0	584	595	20
24	692.2	603.2	666.8	641.4	693.7	604.8	668.3	639.8	2.0	7.0	5.0	692	703	24

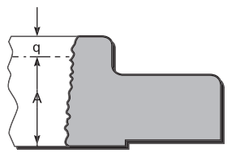
Notes :

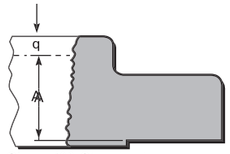
(1) For small male and female joints, care should be taken in the use of these dimensions to insure that the inside diameter of fitting or pipe is small enough to permit sufficient bearing surface to prevent the crushing of the gasket. This applies particularly on lines where the joint is made on the end of the pipe. Inside diameter of fitting should match inside diameter of pipe as specified by purchaser. Threaded companion flanges for small male and female joints are furnished with plain face and are threaded with American National Standard Locknut Thread (NPSL).
(2) Raised portion of full face may be furnished unless otherwise specified on order.
(3) Large male and female faces and large tongue and groove are not applicable to Class 150 because of potential dimensional conflicts.
(4) Height of raised face is either 2 mm or 7 mm.
(5) Height of large and small male and tongue is 7 mm.
(6) Depth of groove or female is 5 mm.

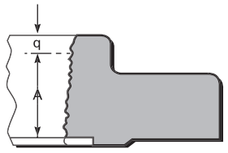
THREAD

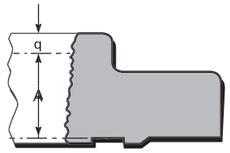
THREAD AND STANDARDS FOR ASME FLANGES(ASME B2.1)

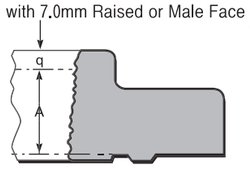


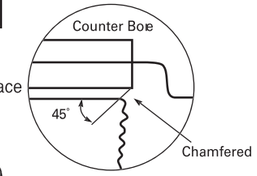












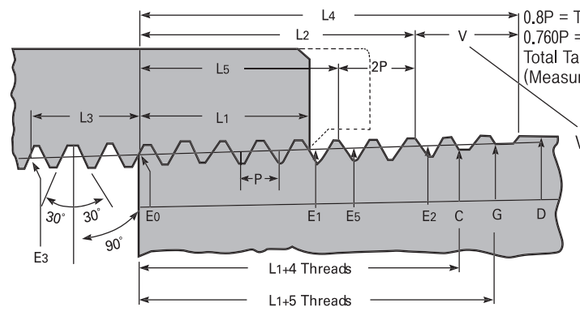
ASME B16.36 FORGED FLANGES

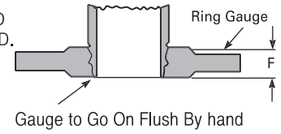
Unit : mm

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	30.1	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	79.4	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 ASME 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 45degrees with the axis of the thread. The chamfer is concentric with the thread and include 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 flanges as shown in the above tables. Threads do not necessarily extend to the face to the flange.



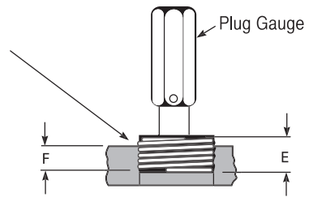


C = Straight Pipe Thread Pitch Dia. for Locknut Connections

G = Minimum Pitch Dia. Straight Female Locknut Thread

F = Thickness of Working Rlug Gauge

Plug Gauge to Enter Until Notch is Flush with First Thread Standard Tolerance is ±One Thread



ASME B16.36 FORGED FLANGES

Unit : mm

Nominal pipe Size	Outside Diameter of Pipe	Threads Per inch	Pitch of Thread	Pitch Diameter at Beginning of External Threads	Handtight Engagement		Effective Thread External		Wrench Make-Up Length for internal Threaded		Over all Length External Threads
					Length	Pitch Diameter	Length	Pitch Diameter	Length	Pitch Diameter	
	D	N	P	E0	L1	E1	L2	E2	L3	E3	L
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
22	559	8	3.2	551.8	57.2	555.4	77.5	552.4	-	-	-
24	610	8	3.2	602.3	60.3	606.1	82.6	607.5	6.4	601.9	93.6

PIPE & FITTINGS WALL THICKNESS SCHEDULES DIMENSION

Nominal Pipe Size		Outside Diam.	Well	Nominal Wall Thickness (Stainless steel)					Nominal Wall Thickness (Carbon & Low Alloy Steel)			
A	B		I.D	S5S*	S10S*	S20S	S40S	S80S	S5	S10	S20	S30
6	1/8	10.3	W.T	-	1.24	-	1.73	2.41	-	1.24	-	1.45
			I.D	-	7.82	-	6.84	5.48	-	7.82	-	7.40
8	1/4	13.7	W.T	-	1.65	-	2.24	3.02	-	1.65	-	1.85
			I.D	-	10.40	-	9.22	7.66	-	10.40	-	10.00
10	3/8	17.1	W.T	-	1.65	-	2.31	3.20	-	1.65	-	1.85
			I.D	-	13.80	-	12.48	10.70	-	13.80	-	13.40
15	1/2	21.3	W.T	1.65	2.11	-	2.77	3.73	1.65	2.11	-	2.41
			I.D	18.00	17.08	-	15.76	13.84	18.00	17.08	-	16.48
20	3/4	26.7	W.T	1.65	2.11	-	2.87	3.91	1.65	2.11	-	2.41
			I.D	23.40	22.48	-	20.96	18.88	23.40	22.48	-	21.88
25	1	33.4	W.T	1.65	2.77	-	3.38	4.55	1.65	2.77	-	2.90
			I.D	30.10	27.86	-	26.64	24.30	30.10	27.86	-	27.60
32	1 1/4	42.2	W.T	1.65	2.77	-	3.56	4.85	1.65	2.77	-	2.97
			I.D	38.90	36.66	-	35.08	32.50	38.90	36.66	-	36.26
40	1 1/2	48.3	W.T	1.65	2.77	-	3.68	5.08	1.65	2.77	-	3.18
			I.D	45.00	42.76	-	40.94	38.14	45.00	42.76	-	41.94
50	2	60.3	W.T	1.65	2.77	-	3.91	5.54	1.65	2.77	-	3.18
			I.D	57.00	54.76	-	52.48	49.22	57.00	54.76	-	53.94
65	2 1/2	73.0	W.T	2.11	3.05	-	5.16	7.01	2.11	3.05	-	4.78
			I.D	68.78	66.90	-	62.68	58.98	68.78	66.90	-	63.44
80	3	88.9	W.T	2.11	3.05	-	5.49	7.62	2.11	3.05	-	4.78
			I.D	84.68	82.80	-	77.92	73.66	84.68	82.80	-	79.34
90	3 1/2	101.6	W.T	2.11	3.05	-	5.74	8.08	2.11	3.05	-	4.78
			I.D	97.38	95.50	-	90.12	85.44	97.38	95.50	-	92.04
100	4	114.3	W.T	2.11	3.05	-	6.02	8.56	2.11	3.05	-	4.78
			I.D	110.08	108.20	-	102.26	97.18	110.08	108.20	-	104.74
125	5	141.3	W.T	2.77	3.40	-	6.55	9.53	2.77	3.40	-	-
			I.D	135.76	134.50	-	128.20	122.24	135.76	134.50	-	-
150	6	168.3	W.T	2.77	3.40	-	7.11	10.97	2.77	3.40	-	-
			I.D	162.76	161.50	-	154.08	146.36	162.76	161.50	-	-
200	8	219.1	W.T	2.77	3.76	-	8.18	12.70	2.77	3.76	6.35	7.04
			I.D	213.56	211.58	-	202.74	193.70	213.56	211.58	206.40	205.02
250	10	273.1	W.T	3.40	4.19	-	9.27	12.70	3.40	4.19	6.35	7.80
			I.D	266.30	264.72	-	254.56	247.70	266.30	264.72	260.40	257.50
300	12	323.9	W.T	3.96	4.57	-	9.53	12.70	3.96	4.57	6.35	8.38
			I.D	315.98	314.76	-	304.84	298.50	315.98	314.76	311.20	307.14
350	14	355.6	W.T	3.96	4.78	-	9.53	12.70	3.96	6.35	7.92	9.53
			I.D	347.68	346.04	-	336.54	330.20	347.68	342.90	339.76	336.54
400	16	406.4	W.T	4.19	4.78	-	9.53	12.70	4.19	6.35	7.92	9.53
			I.D	398.02	396.84	-	387.34	381.00	398.02	393.70	390.56	387.34
450	18	457.0	W.T	4.19	4.78	-	9.53	12.70	4.19	6.35	7.92	11.13
			I.D	448.62	447.44	-	437.94	431.60	448.62	444.30	441.16	434.74
500	20	508.0	W.T	4.78	5.54	7.90	9.53	12.70	4.78	6.35	9.53	12.70
			I.D	498.44	496.92	492.20	488.94	482.60	498.44	495.30	488.94	482.60
550	22	559.0	W.T	4.78	5.54	-	-	-	4.78	6.35	9.53	12.70
			I.D	549.44	547.92	-	-	-	549.44	546.30	539.94	533.60
600	24	610.0	W.T	5.54	6.35	-	9.53	12.70	5.54	6.35	9.53	14.27
			I.D	598.92	597.30	-	590.94	584.60	598.92	597.30	590.94	581.46
650	26	660.4	W.T	-	-	-	9.53	12.70	-	7.92	12.70	-
			I.D	-	-	-	641.34	635.00	-	644.56	635.00	-
700	28	711.2	W.T	-	-	-	-	-	-	7.92	12.70	15.88
			I.D	-	-	-	-	-	-	695.36	685.80	679.44
750	30	762.0	W.T	6.35	7.92	-	-	-	6.35	7.92	12.70	15.88
			I.D	749.30	746.16	-	-	-	749.30	746.16	736.60	730.24
800	32	813.0	W.T	-	-	-	-	-	-	7.92	12.70	15.88
			I.D	-	-	-	-	-	-	797.16	787.60	781.24
850	34	864.0	W.T	-	-	-	-	-	-	7.92	12.70	15.88
			I.D	-	-	-	-	-	-	848.16	838.60	832.24
900	36	914.0	W.T	-	-	-	-	-	-	7.92	12.70	15.88
			I.D	-	-	-	-	-	-	898.16	888.60	882.24
950	38	965.0	W.T	-	-	-	-	-	-	-	-	-
			I.D	-	-	-	-	-	-	-	-	-
1000	40	1016.0	W.T	-	-	-	-	-	-	-	-	-
			I.D	-	-	-	-	-	-	-	-	-
1050	42	1067.0	W.T	-	-	-	-	-	-	-	-	-
			I.D	-	-	-	-	-	-	-	-	-
1100	44	1118.0	W.T	-	-	-	-	-	-	-	-	-
			I.D	-	-	-	-	-	-	-	-	-
1150	46	1168.0	W.T	-	-	-	-	-	-	-	-	-
			I.D	-	-	-	-	-	-	-	-	-
1200	48	1219.0	W.T	-	-	-	-	-	-	-	-	-
			I.D	-	-	-	-	-	-	-	-	-

▶ **Carbon & Low Alloy Steel (B36.10M)**

The wall thickness shown represent nominal or average wall diamensions which are subject to a-12½% mill tolerance.
Note that schedule 40 in. sizes 12" (304.8mm) and larger and that schedule 80 in sizes10" (254mm) and larger do not agree with schedules 40S and 80S of ASME B36. 19 nor with standard weight and extra strong respectively.

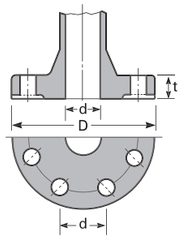
Nominal Wall Thickness (Carbon & Low Alloy Steel)										Outside Diam.	Nominal Pipe Size	
STD	S40	S60	XS	S80	S100	S120	S140	S160	XXS		A	B
1.73	1.73	-	2.41	2.41	-	-	-	-	-	10.3	6	1/8
6.84	6.84	-	5.48	5.48	-	-	-	-	-			
2.24	2.24	-	3.02	3.02	-	-	-	-	-	13.7	8	1/4
9.22	9.22	-	7.66	7.66	-	-	-	-	-			
2.31	2.31	-	3.20	3.20	-	-	-	-	-	17.1	10	3/8
12.48	12.48	-	10.70	10.70	-	-	-	-	-			
2.77	2.77	-	3.73	3.73	-	-	-	4.78	7.47	21.3	15	1/2
15.76	15.76	-	13.84	13.84	-	-	-	11.74	6.36			
2.87	2.87	-	3.91	3.91	-	-	-	5.56	7.82	26.7	20	3/4
20.96	20.96	-	18.88	18.88	-	-	-	15.58	11.06			
3.38	3.38	-	4.55	4.55	-	-	-	6.35	9.09	33.4	25	1
26.64	26.64	-	24.30	24.30	-	-	-	20.70	15.22			
3.56	3.56	-	4.85	4.85	-	-	-	6.35	9.70	42.2	32	1 1/4
35.08	35.08	-	32.50	32.50	-	-	-	29.50	22.80			
3.68	3.68	-	5.08	5.08	-	-	-	7.14	10.15	48.3	40	1 1/2
40.94	40.94	-	38.14	38.14	-	-	-	34.02	28.00			
3.91	3.91	-	5.54	5.54	-	-	-	8.74	11.07	60.3	50	2
52.48	52.48	-	49.22	49.22	-	-	-	42.82	38.16			
5.16	5.16	-	7.01	7.01	-	-	-	9.53	14.02	73.0	65	2 1/2
62.68	62.68	-	58.98	58.98	-	-	-	53.94	44.96			
5.49	5.49	-	7.62	7.62	-	-	-	11.13	15.24	88.9	80	3
77.92	77.92	-	73.66	73.66	-	-	-	66.64	58.42			
5.74	5.74	-	8.08	8.08	-	-	-	12.70	-	101.6	90	3 1/2
90.12	90.12	-	85.44	85.44	-	-	-	76.20	-			
6.02	6.02	-	8.56	8.56	-	11.13	-	13.49	17.12	114.3	100	4
102.26	102.26	-	97.18	97.18	-	92.04	-	87.32	80.06			
6.55	6.55	-	9.53	9.53	-	12.70	-	15.88	19.05	141.3	125	5
128.20	128.20	-	122.24	122.24	-	115.90	-	109.54	103.20			
7.11	7.11	-	10.97	10.97	-	14.27	-	18.26	21.95	168.3	150	6
154.08	154.08	-	146.36	146.36	-	139.76	-	131.78	124.40			
8.18	8.18	10.31	12.70	12.70	15.09	18.26	20.62	23.01	22.23	219.1	200	8
202.74	202.74	198.48	193.70	193.70	188.92	182.58	177.86	173.08	174.64			
9.27	9.27	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40	273.1	250	10
254.56	254.56	247.70	247.70	242.92	236.58	230.22	222.30	215.94	222.30			
9.53	10.31	14.27	12.70	17.48	21.44	25.40	28.58	33.32	25.40	323.9	300	12
304.84	303.28	295.36	298.50	288.94	281.02	273.10	266.74	257.26	273.10			
9.53	11.13	15.09	12.70	19.05	23.83	27.79	31.75	35.71	-	355.6	350	14
336.54	333.34	325.42	330.20	317.50	307.94	300.02	292.10	284.18	-			
9.53	12.70	16.66	12.70	21.44	26.19	30.96	36.53	40.49	-	406.4	400	16
387.34	381.00	373.08	381.00	363.52	354.02	344.48	333.34	325.42	-			
9.53	14.27	19.05	12.70	23.83	29.36	34.93	39.67	45.24	-	457.0	450	18
437.94	428.46	418.90	431.60	409.34	398.28	387.14	377.66	366.52	-			
9.53	15.09	20.62	12.70	26.19	32.54	38.10	44.45	50.01	-	508.0	500	20
488.94	477.82	466.76	482.60	455.62	442.92	431.80	419.10	407.98	-			
9.53	-	22.23	12.70	28.58	34.93	41.28	47.63	53.98	-	559.0	550	22
539.94	-	514.54	533.60	501.84	489.14	476.44	463.74	451.04	-			
9.53	17.48	24.61	12.70	30.96	38.89	46.02	52.37	59.54	-	610.0	600	24
590.94	575.04	560.78	584.60	548.08	532.22	517.96	505.26	490.92	-			
9.53	-	-	12.70	-	-	-	-	-	-	660.4	650	26
641.34	-	-	635.00	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	711.2	700	28
692.14	-	-	685.80	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	762.0	750	30
742.94	-	-	736.60	-	-	-	-	-	-			
9.53	17.48	-	12.70	-	-	-	-	-	-	813.0	800	32
793.94	778.04	-	787.60	-	-	-	-	-	-			
9.53	17.48	-	12.70	-	-	-	-	-	-	864.0	850	34
844.94	829.04	-	838.60	-	-	-	-	-	-			
9.53	19.05	-	12.70	-	-	-	-	-	-	914.0	900	36
894.94	875.90	-	888.60	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	965.0	950	38
945.94	-	-	939.60	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	1016.0	1000	40
996.94	-	-	990.60	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	1067.0	1050	42
1047.94	-	-	1041.60	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	1118.0	1100	44
1098.94	-	-	1092.60	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	1168.0	1150	46
1148.94	-	-	1142.60	-	-	-	-	-	-			
9.53	-	-	12.70	-	-	-	-	-	-	1219.0	1200	48
1199.94	-	-	1193.60	-	-	-	-	-	-			

▶ **Stainless steel (B 36.19M)**

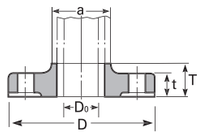
The wall thickness shown represent nominal or average wall dimensions which are subject to a-12½% mill tolerance.
+ Sizes 14" (355.6mm) through 30" (762.0mm) are not at publication date covered in B36 19, and dimansions listed are those commonly used in the industry.
* Schedules 5S and 10S wall thicknesses do not permit threading in accordance with ASME B2 1.
** Note that schedule 40S and schedule 80S in these sizes do not agree with schedule 40 and schedule 80 of ASME B36.10.
and that they are identical to standard weight and extra strong respectively of ASME B36. 10.

ASME B16.5-2003ED FORGED FLANGES (Reversion of ASME B16.5-1996)

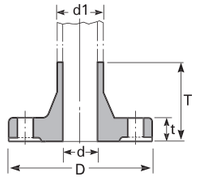
SOLID FLANGE



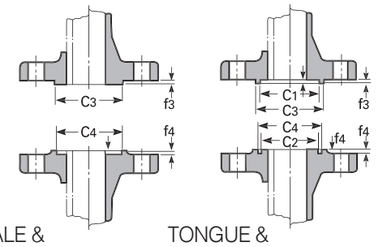
SLIP-ON FLANGE



WELDING NECK FLANGE



TYPE of GA SKET SURFACE



MALE & FEMALE TYPE

TONGUE & GROOVE TYPE

WELDING NECK

Place	Range	Tolerance (mm)
Outside Diameter	When O.D is 24" or Less	±1.6* (±0.063in)
	When O.D is Over 24"	±3.2* (±0.125in)
Inside Diameter	10" and Smaller	±1.0 (±0.03in)
	12" thru 18"	±1.5 (±0.16in)
	20" and Larger	+3.0 (+0.12in) -1.5 (-0.06in)
Diameter of Contact Face	2.0mm Raised Face(Outside)	±1.0 (±0.03in)
	7.0mm Raised Face(Outside)	±0.5 (±0.02in)
	Tongue, goove, female (Inside & Outside)	±0.5 (±0.02in)
Diameter of Hub at Base	When Hub Base is 24" or Smaller	±1.6* (±0.063in)
	When Hub Base isOver 24"	±3.2* (±0.125in)
Diameter of Hub at Welding Point	When O.D is 5" or Less	+2.0 (+0.09in) -1.0 (-0.03in)
	When O.D is Over 6"	+4.0 (+0.16in) -1.0 (-0.03in)
Drilling	Bolt Circle Diameter	±1.5 (±0.06in)
	Bolt to Bolt Hole	±0.8 (±0.03in)
	Eccentricity of Bolt Circle with Respect to Facing	NPS≤2 1/2" 0.8 (0.03in) Max. NPS≥3" 1.5 (0.06in) Max.
	Eccentricity of Bolt Circle with Respect to Bore	0.8 Max.* (0.03in)
	Eccentricity of Facing with Respect to Bore	0.8 Max.* (0.03in)
Thickness	When O.D is 18" or Less	+3.0 (+0.12in) -0.0 (-0.0in)
	When O.D is Over 20"	+5.0 (+0.19in) -0.0 (-0.0in)
Length Thru Hub	When O.D is 4" or Less	±1.5 (±0.06in)
	5" thru 10"	+1.5 (+0.06in) -3.0 (-0.12in)
	When O.D is Over 12"	+3.0 (+0.12in) -5.0 (-0.18in)

Notes :

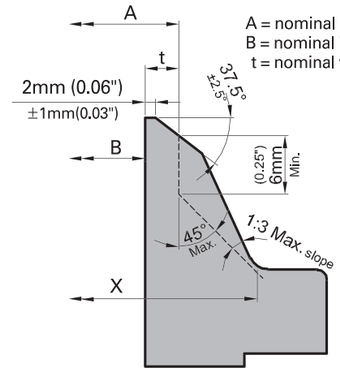
* This tolerance is not covered in ASME B 16.5, but maker's option.

THREAD, SOCKET-WELDING, SLIP-ON, LAP JOINT AND BLIND

Place		Range	Tolerance (mm)
Outside Diameter		When O.D is 24" or Less	±1.6* (±0.063in)
		When O.D is Over 24"	±3.2* (±0.125in)
Inside Diameter	Counter bores Threaded	When O.D is 10" or Less	+1.0 (+0.03in) -0.0 (-0.0in)
		When O.D is Over 12"	+1.5 (+0.06in) -0.0 (-0.0in)
	Counterbores Socket Welding	1/2≤ NPS ≤3	±0.25 (±0.01in)
	Lap joint Slip-On Socket Welding	When O.D is 10" or Less	+1.0 (+0.03in) -0.0 (-0.0in)
		When O.D is Over 12"	+1.5 (+0.06in) -0.0 (-0.0in)
Diameter of Contact Face		2.0mm Raised Face (Outside)	±1.0 (±0.03in)
		7.0mm Raised Face (Outside)	±0.5 (±0.02in)
		Tongue, goove, female (Inside & Outside)	±0.5 (±0.02in)
Diameter of Hub at Base		When Hub Base is 24" or Smaller	±1.6* (±0.063in)
		When Hub Base is Over 24"	±3.2* (±0.125in)
Drilling		Bolt Circle Diameter	±1.5 (±0.06in)
		Bolt to Bolt Hole	±0.8 (±0.03in)
		Eccentricity of Bolt Circle with Respect to Facing	NPS≤2 1/2" ±0.8 (0.03in) Max. NPS≥3" ±1.5 (0.03in) Max.
		Eccentricity of Bolt Circle with Respect to Bore	0.8 Max.* (0.03in)
		Eccentricity of Facing with Respect to Bore	0.8 Max.* (0.03in)
Thickness		When O.D is 18" or Less	+3.0 (+0.12in) -0.0 (-0.0in)
		When O.D is Over 20"	+5.0 (+0.19in) -0.0 (-0.0in)
Length Thru Hub		When O.D is 4" or Less	±1.5 (±0.06in)
		5" thru 10"	+1.5 (+0.06in) -3.0 (-0.12in)
		When O.D is Over 12"	+3.0 (+0.12in) -5.0 (-0.18in)

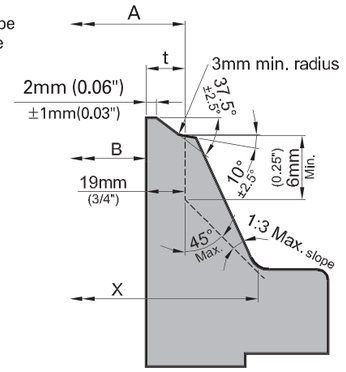
WELDING ENDS

ASME B16.5 FORGED FLANGES



A = nominal outside diameter of pipe
B = nominal inside diameter of pipe
t = nominal wall thickness of pipe

Bevel for Wall Thickness t
From 5mm to 22mm inclusive
(0.19in) (0.88in)



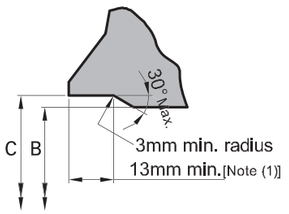
Bevel for Wall Thickness t
Greater Than 22mm
(0.88in)

Notes :

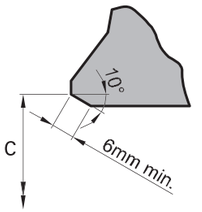
When the thickness of the hub at the bevel is greater than that of the pipe to which the flange is joined and the additional thickness is provided on the outside diameter, a traper weld having a slope not exceeding 1 to 3 may be employed or, alternatively, the greater outside diameter may be tapered at the same maximum slope or less, from a point on the welding bevel equal to the outside diameter of 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 t 3.

When flanges covered by this standard are intended for services with light wall, higher strength pipe, the thickness of the hub at 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.



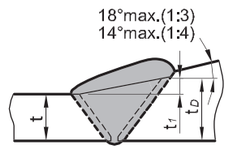
(a)Inside Contour for Use With Rectangular Backing Ring



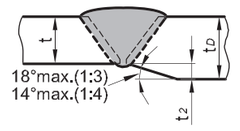
Inside Contour for Use With Taper Backing Ring

- A = nominal outside diameter of welding end, mm
- B = nominal inside diameter of pipe(=A-2t),mm
- C= A -0.79 - 1.75t - 0.25, mm
- t = niminal wall thickness of pipe, mm
- 0.79mm = minus tolerance on outside diameter of pope to ASTM A106, etc.
- 1.75t = 87.5% of nominal wall (permitted by ASTM A106,etc.) multiplied by to conver into terms of daimeter
- 0.25mm = plus tolerance on diameter C, mm.

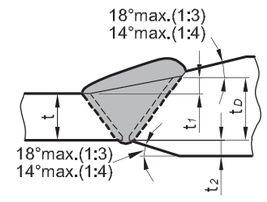
Note (1) 13mm depth based on use of 19mm wide backing ning



(a)Bevel for Outside Thickness



(b)Bevel for inside Thickness



(c)Bevel for Conbined Thickness

Notes :

(1) When the materials joined have equal minimum specified yield strength, there shall be no restriction on the minimum slope.

(2) Neither t1, t2, nor their sum(t1 + t2) shall exceed 0.5t.

(3) When the minimum specified yield strengths of the sections to be joined are unequal, the value of tD shall at least equal times the ratio of minimum specified yield strength of the pipe to minimum specified yield strength of the flange.

ASTM Material Chemical Composition & Mechanical Requirements

ASTM Grade	UNS Designation		Chemical Composition (%)													Mechanical Requirements				
			C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	N	Y.S[7] (Mpa)	T.S (Mpa)	E.L (%)	R.A (%)	H.B
A105	K03504	Max.	0.35	0.35	1.05	0.035	0.040	0.40	0.30	0.12	0.40	0.08							187
		Min.		0.10	0.60										250	485	22	30	
A266 GR.1	K03506	Max.	0.30	0.35	1.05	0.025	0.025									585			
		Min.		0.15	0.40										205	415	23	38	
A266 GR.2	K03506	Max.	0.30	0.35	1.05	0.025	0.025									655			
		Min.		0.15	0.40										250	485	20	33	
A266 GR.3	K05001	Max.	0.35	0.35	1.35	0.025	0.025									690			
		Min.		0.15	0.80										260	515	19	30	
A266 GR.4	K03017	Max.	0.30	0.35	1.35	0.025	0.025									655			
		Min.		0.15	0.80										250	485	20	33	
A350 LF.1	K03009	Max.	0.30	0.30	1.35	0.035	0.040	0.40	0.30	0.12	0.4	0.05				585			197
		Min.		0.15	0.60										205	415		38	
A350 LF.2	K03011	Max.	0.30	0.30	1.35	0.035	0.040	0.40	0.30	0.12	0.4	0.05				655			197
		Min.		0.15	0.60										250	485		30	
A694	K03014	Max.	0.26	0.35	1.40	0.025	0.025								F42:290 F46:315 F48:330 F50:345 F52:360 F56:385 F60:415 F65:450 F70:485	F42:415 F46:415 F48:425 F50:440 F52:455 F56:470 F60:515 F65:530 F70:565	F42~F65 20 F70:18		
		Min.		0.15															
A182 F1	K12822	Max.	0.28	0.35	0.90	0.045	0.045			0.65									192
		Min.		0.15	0.60					0.44					275	485	20	30	143
A182 F5	K41545	Max.	0.15	0.50	0.60	0.030	0.030	0.50	6.00	0.65									217
		Min.			0.30				4.00	0.44					275	485	20	35	143
A182 F5a	K42544	Max.	0.25	0.50	0.60	0.040	0.030	0.50	6.00	0.65									248
		Min.							4.00	0.44					450	620	22	50	187
A182 F9	K90941	Max.	0.15	1.00	0.60	0.030	0.030		10.00	1.10									217
		Min.		0.50	0.30				8.00	0.90					380	585	20	40	179
A182 F91	K90901	Max.	0.12	0.50	0.60	0.020	0.010	0.40	9.50	1.05		0.25	0.10	0.07					248
		Min.	0.08	0.20	0.30	※Al 0.02 Ti 0.01 Zr 0.01			8.00	0.85		0.18	0.06	0.03	415	585	20	40	
A182 F11CL1	K11597	Max.	0.15	1.00	0.60	0.030	0.030		1.50	0.65									174
		Min.	0.05	0.50	0.30				1.00	0.44					205	415	20	45	121
A182 F11CL2	K11572	Max.	0.20	1.00	0.80	0.040	0.040		1.50	0.65									207
		Min.	0.10	0.50	0.30				1.00	0.44					275	485	20	30	143
A182 F11CL3	K11572	Max.	0.20	1.00	0.80	0.040	0.040		1.50	0.65									207
		Min.	0.10	0.50	0.30				1.00	0.44					310	515	20	30	156
A182 F12CL1	K11562	Max.	0.15	0.50	0.60	0.045	0.045		1.25	0.65									174
		Min.	0.05		0.30				0.80	0.44					220	415	20	45	121
A182 F12CL2	K11564	Max.	0.20	0.60	0.80	0.040	0.040		1.25	0.65									207
		Min.	0.10	0.10	0.30				0.80	0.44					275	485	20	30	143
A182 F22CL1	K21590	Max.	0.15	0.50	0.60	0.040	0.040		2.50	1.13									170
		Min.	0.05		0.30				2.00	0.87					205	415	20	35	
A182 F22CL3	K21590	Max.	0.15	0.50	0.60	0.040	0.040		2.50	1.13									207
		Min.	0.05		0.30				2.00	0.87					310	515	20	30	156
A182 F22V	K31838	Max.	0.15	0.10	0.60	0.015	0.010	0.25	2.50	1.10	0.20	0.35	0.07			780			237
		Min.	0.11		0.30	※B 0.002 Ca 0.015			2.00	0.90		0.25	※Ti 0.030		415	585	18	45	174
A350 LF3	K32025	Max.	0.20	0.35	0.90	0.035	0.040	3.70	0.30	0.12		0.03				655			197
		Min.		0.20				3.30							260	485		35	
A182 F304	S30400	Max.	0.08	1.00	2.00	0.045	0.030	11.00	20.00										
		Min.						8.00	18.00						205	515[8]	30	50	
A182 F304L	S30403	Max.	0.03	1.00	2.00	0.045	0.030	13.00	20.00										
		Min.						8.00	18.00						170	485[9]	30	50	
A182 F304H	S30409	Max.	0.10	1.00	2.00	0.045	0.030	11.00	20.00										
		Min.	0.04					8.00	18.00						205	515[8]	30	50	
A182 F310	S31000	Max.	0.25	1.00	2.00	0.045	0.030	22.00	26.00										
		Min.						19.00	24.00						205	515[8]	30	50	
A182 F316	S31600	Max.	0.08	1.00	2.00	0.045	0.030	14.00	18.00	3.00									
		Min.						10.00	16.00	2.00					205	515[8]	30	50	
A182 F316L	S31603	Max.	0.03	1.00	2.00	0.045	0.030	15.00	18.00	3.00									
		Min.						10.00	16.00	2.00					170	485[9]	30	50	
A182 F316H	S31609	Max.	0.10	1.00	2.00	0.045	0.030	14.00	18.00	3.00									
		Min.	0.04					10.00	16.00	2.00					205	515[8]	30	50	
A182 F317	S31700	Max.	0.08	1.00	2.00	0.045	0.030	15.00	20.00	4.00									
		Min.						11.00	18.00	3.00					205	515[8]	30	50	
A182 F317L	S31703	Max.	0.03	1.00	2.00	0.045	0.030	15.00	20.00	4.00									
		Min.						11.00	18.00	3.00					170	485[9]	30	50	
A182 F321	S32100	Max.	0.08	1.00	2.00	0.045	0.030	12.00	19.00										
		Min.						9.00	17.00	※Ti C%*5~0.7			205	515[8]	30	50			
A182 F347	S34700	Max.	0.08	1.00	2.00	0.045	0.030	13.00	20.00				1.10						
		Min.						9.00	17.00				C*10		205	515[8]	30	50	
A182 F6aCL1	S41000	Max.	0.15	1.00	1.00	0.040	0.030	0.50	13.50										207
		Min.							11.50						275	485	18	35	143
A182 F51	S31803	Max.	0.03	1.00	2.00	0.030	0.020	6.50	23.00	3.50				0.20					
		Min.						4.50	21.00	2.50				0.08	450	620	25	45	
A182 F53	S32750	Max.	0.03	0.80	1.20	0.035	0.020	8.00	26.00	5.00	0.50			0.32					310
		Min.						6.00	24.00	3.00				0.24	550[10]	800[10]	15		

Notes :

(1) All values ar maximum unless otherwise stated

(2) The present grade F5a(0.25 max carbon) previous to 1955 was assigned the identification symbol F5. Identification symbol F5 in 1955 was assigned to the 0.15 max carbon grade to be consistent with ASTM specifications for other products such as pipe, tubing, bolting, welding fittings, and the like

Material Group No.	GROUP 1 MATERIALS	PRODUCT FORMS		
	Nominal Designation Steel	Forgings	Castings	Plates
		Spec.-Gr. Notes	Spec.-Gr. Notes	Spec.-Gr. Notes
1.1	C-Si	A105	A216-WCB	A515.70
	C-Mn-Si	A350-LF2		A516.70
	3 1/2 Ni	A350-LF3		
1.2	C-Mn-Si		A216-WCC	
			A352-LCC	
	2 1/2 Ni		A352-LC2	A203-B
	3 1/2 Ni		A352-LC3	A203-E
1.3	C-Si		A352-LCB (1)	A515-65
	C-Mn-Si			A516-65
	2 1/2 Ni			A203-A
	3 1/2 Ni			A203-D
1.4	C-Si	A350-LF1 CL.1		A515-60
	C-Mn-Si			A516-60
1.5	C-1/2 Mo	A182-F1		A204-A
				A204-B
1.7	1/2Cr-1/2Mo	A182-F2		
	Ni-1/2Cr-1/2Mo		A217-WC4	
	3/4Ni-3/4Cr-1Mo		A217-WC5	
1.9	1/4Cr-1/2Mo		A217-WC6	
	1 1/4Cr-1/2Mo-Si	A182-11 CL.2		A378-11 CL.2
1.10	2 1/4Cr-1Mo	A182-F22 CL.3	A217-WC9	A378-22 CL.2
1.13	5 Cr-1/2Mo	A181-F5a	A217-C5	
1.14	9 Cr-1 Mo	A182-F9	A217-C12	

Material Group No.	GROUP 1 MATERIALS	PRODUCT FORMS		
	Nominal Designation Steel	Forgings	Castings	Plates
		Spec.-Gr. Notes	Spec.-Gr. Notes	Spec.-Gr. Notes
1.1	C-Si	A105	A216-WCB	A515.70
	C-Mn-Si	A350-LF2		A516.70
	3 1/2 Ni	A350-LF3		
1.2	C-Mn-Si		A216-WCC	
			A352-LCC	
	2 1/2 Ni		A352-LC2	A203-B
	3 1/2 Ni		A352-LC3	A203-E
1.3	C-Si		A352-LCB(1)	A515-65
	C-Mn-Si			A516-65
	2 1/2 Ni			A203-A
	3 1/2 Ni			A203-D
1.4	C-Si	A350-LF1CL.1		A515-60
	C-Mn-Si			A516-60
1.5	C-1/2 Mo	A182-F1		A204-A
				A204-B
1.7	1/2Cr-1/2Mo	A182-F2		
	Ni-1/2Cr-1/2Mo		A217-WC4	
	3/4Ni-3/4Cr-1Mo		A217-WC5	
1.9	1/4Cr-1/2Mo		A217-WC6	
	1 1/4Cr-1/2Mo-Si	A182-11CL.2		A378-11CL.2
1.10	2 1/4Cr-1Mo	A182-F22CL.3	A217-WC9	A378-22CL.2
1.13	5 Cr-1/2Mo	A181-F5a	A217-C5	
1.14	9 Cr-1 Mo	A182-F9	A217-C12	

(3) For Grade F22V, rare earth metals(REM) may be added in place of calcium, subject to agreement between the producer and the purchaser. In that case the total amount of REM shall be determined and eported.

(4) Grades F304, F304L, F316, and F316L shall have a nitrogen content of 0.10%

(5) Grade F321 shall have a tianium content of not less than four times the carbon content and not more than 0.70%

(6) Grade F347 shall have a columbium content of not less than ten times the carbon content and not more than 1.10%

(7) Determined by the 0.2% offset method. For ferritic steels only, the 0.5% extension-under-load method may also be used.

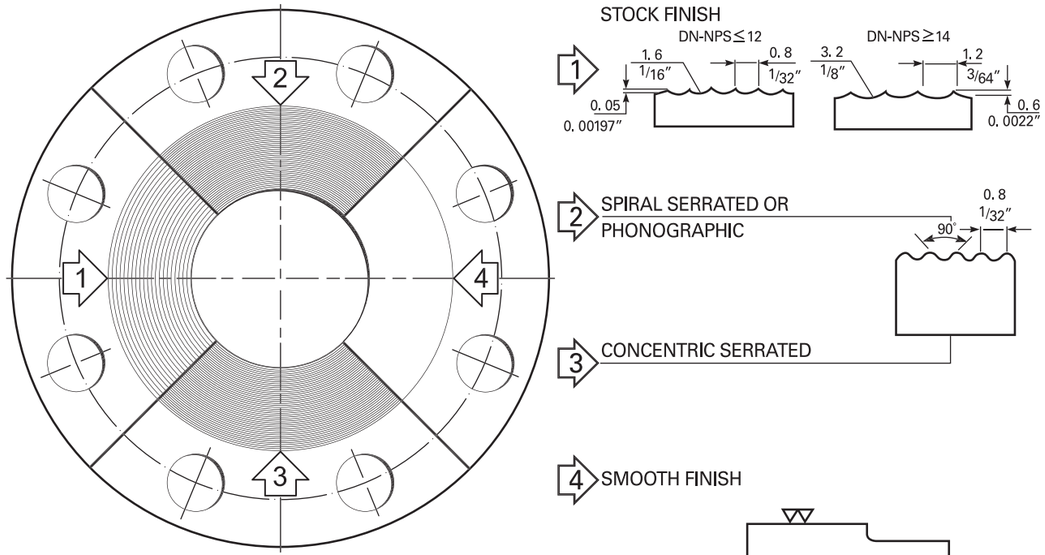
(8) For sections over 5 in.(130mm) in thickness, the minium tensile strength shall be 70 ksi(485 Mpa)

(9) For sections over 5 in.(130mm) in thickness, the minium tensile strength shall be 65 ksi(450 Mpa)

(10) For sections over 2 in.(50mm) in thickness, the minium tensile strength shall be 106 ksi(730 Mpa); the minimum yield strength shall be 75 ksi(515 Mpa)

STANDARD FINISH

STANDARD FINISHES for Face of Flange(ASME 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 a1/16 “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 125 inch to 250 inch(ASME B16.5 para 6.4.5)

1. RAISED FACE, AND LARGE MALE AND FEMALE

Either a serrated-concentric or serrated-spiral finish having from 3.2 to 6.3 (125 to 250 in) average roughness shall be furnished. The cutting tool employed should have an approximate 0.06 inch(1.5mm) or larger radius. The resultant surface finish shall have a 125 inch(3.2) to 500 inch(12.5) approximate roughness.

2. TONGUE AND GROOVE, AND SMALL MALE AND FEMALE

The gasket contact surface finish shall not exceed 125 inch(3.2) roughness.

3. RING JOINT

The side wall surface finish of the gasket groove shall not exceed 63 inch(1.6) 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 inch 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.

ASME B16.47 SER. A-2006

MSS SP 44 FLANGES



MATERIAL SPECIFICATIONS

1. MATERIALS

A. The steel used in the manufacture of these flanges shall be selected by the manufacturer to meet the following requirements.

B. All materials used for flanges shall be killed steel.

C. The steel used shall be suitable for field welding to other flanges, fittings, or pipe manufactured under ASTM specifications A 105, A 53, A 106, A 350, A 381, A 694, A 707, or API Standard 5L.

$$C.E.=C+\frac{Mn}{6}+\frac{Cr+Mo+V}{5}+\frac{Ni+Cu}{15}$$

D. The steel used shall have a maximum carbon content of 0.35 and a carbon equivalent computed by the following equation : that should not exceed 0.48%, based on ladle analysis. If the carbon equivalent factor exceeds 0.48% the acceptance of the flanges shall be based on agreement between purchaser and manufacturer.

E. The choice and use of alloying elements, combined with the elements within the limits prescribed in Section 1-D to give the required tensile properties prescribed in Section 3.1.4 shall be made by the flange manufacturer and included and reported in the ladle analysis to identify the type of steel.

2. HEAT TREATMENT

The F42 and higher grades of flanges of all pressure classes and the class 400 and higher classes of Grade F36 flanges shall be normalized or quenched and tempered.

3. TEST SPECIMENS

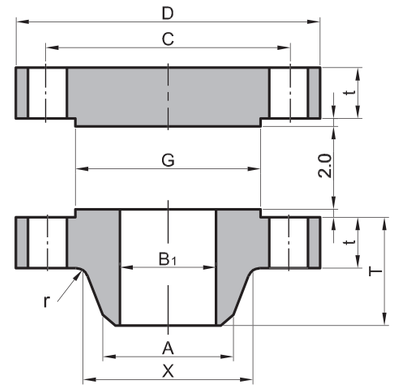
The test specimens may be taken from the forgings or, at the manufacturers' option, from the billets or forging bar entering into the finished product, provided such test blank has undergone relatively the same forming and the equivalent heat treatment as the finished flange. The dimensions of the test blank must be such as to adequately reflect the heat treatment properties of the hub of the flange. Specimens shall be obtained from the midwall of the thinnest section of the hub of the flange or 19mm (3/4 in.) from the surface of the test blank. The orientation of specimens taken from a flange shall be longitudinal.

4. Tensile Requirements(Metric & U.S. Customary)

GRADE	YIELD POINT MIN.		TENSILE STRENGTH MIN.		ELONGATION IN 50 mm or 2 in. MIN. PERCENT
	MPa	ksi	MPa	ksi	
F36	248[(a)]	36[(a)]	414	60	20
F42	290	42	414	60	20
F46	317	46	414	60	20
F48	331	48	427	62	20
F50	345	50	441	64	20
F52	359	52	455	66	20
F56	386	56	469	68	20
F60	414	60	517	75	20
F65	448	65	531	77	18
F70	483	70	552	80	18

(a) Note : except as required in MSS-SP-44. Section 4.2.

CLASS 150 FLANGES



ASME B16.47 SER.A-2006 (MSS SP 44-2006)

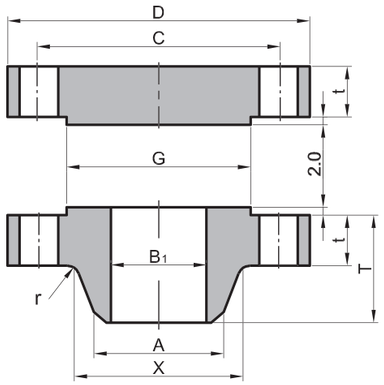
Unit : mm

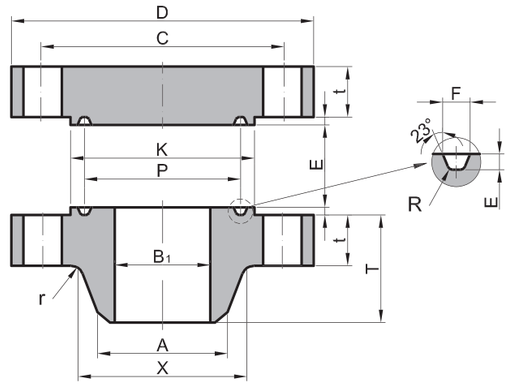
Nominal Pipe Size (inch)	Outside Diameter	Thickness		Bore wall Thickness		Length through Hub	O.D of Raised Face	Diameter of Hub Bevel	Diameter of Base of Hub	Drilling			Radius of Fillet
		WNF	Blind	9.5mm	12.7mm					Diameter of Bolt Circle	Number of holes	Diameter of Bolt hole	
	D	t	t	B1		T	G	A	X	C			r
12	485	30.2	30.2	304.9	298.5	113	381.0	323.8	365	431.8	12	25.4	10
14	535	33.4	33.4	336.6	330.2	125	412.8	355.6	400	476.3	12	28.4	10
16	595	35.0	35.0	387.4	381.0	125	469.9	406.4	457	539.8	16	28.4	10
18	635	38.1	38.1	438.2	431.8	138	533.4	457.0	505	577.9	16	31.8	10
20	700	41.3	41.3	489.0	482.6	143	584.2	508.0	559	635.0	20	31.8	10
22	750	44.5	44.5	539.8	533.4	148	641.4	558.8	610	692.2	20	35.1	10
24	815	46.1	46.1	590.6	584.2	151	692.2	610.0	663	749.3	20	35.1	10
26	870	66.7	66.7	641.4	635.0	119	749.0	660.4	676	806.4	24	35.1	10
28	925	69.9	69.9	692.2	685.8	124	800.0	711.2	727	863.6	28	35.1	11
30	985	73.1	73.1	743.0	736.6	135	857.0	762.0	781	914.4	28	35.1	11
32	1060	79.4	79.4	793.8	787.4	143	914.0	812.8	832	977.9	28	41.3	11
34	1110	81.0	81.0	844.6	838.2	148	965.0	863.6	883	1028.7	32	41.3	13
36	1170	88.9	88.9	895.4	889.0	156	1022.0	914.4	933	1085.8	32	41.3	13
38	1240	85.8	85.8	946.2	939.8	156	1073.0	965.2	991	1149.4	32	41.3	13
40	1290	88.9	88.9	997.0	990.6	162	1124.0	1016.0	1041	1200.2	36	41.3	13
42	1345	95.3	95.3	1047.8	1041.4	170	1194.0	1066.8	1092	1257.3	36	41.3	13
44	1405	100.1	100.1	1098.6	1092.2	176	1245.0	1117.6	1143	1314.4	40	41.3	13
46	1455	101.6	101.6	1149.4	1143.0	184	1295.0	1168.4	1197	1365.2	40	41.3	13
48	1510	106.4	106.4	1200.2	1193.8	191	1359.0	1219.2	1248	1422.4	44	41.3	13
50	1570	109.6	109.6	1251.0	1244.6	202	1410.0	1270.0	1302	1479.6	44	47.6	13
52	1625	114.3	114.3	1301.8	1295.4	208	1461.0	1320.8	1353	1536.7	44	47.6	13
54	1685	119.1	119.1	1352.6	1346.2	214	1511.0	1371.6	1403	1593.8	44	47.6	13
56	1745	122.3	122.3	1403.4	1397.0	227	1575.0	1422.4	1457	1651.0	48	47.6	13
58	1805	127.0	127.0	1454.2	1447.8	233	1626.0	1473.2	1508	1708.2	48	47.6	13
60	1855	130.2	130.2	1505.0	1498.6	238	1676.0	1524.0	1559	1759.0	52	47.6	13

Notes :

(1) For the 'Bore'(B1) other than wall thickness 9.5mm and 12.7mm, refer to page 54-55.
(2) Class 150 flanges will be furnished with 1.6mm(0.06") raised face, which is excepted from 'Thickness'(t) and 'Length through Hub'(T).
(3) Flanges dimensions of size 12" through 24" flanges [except 22"] are in accordance with ASME B16.5
(4) Blind flanges mays be made with or without hubs at the manufactures's option.

CLASS 300 FLANGES





ASME B16.47 SER.A-2006 (MSS SP 44-2006)

Unit : mm

Nominal Pipe Size (inch)	Outside Diameter	Thickness		Bore wall Thickness		Length through Hub	O.D of Raised Face	Diameter of Hub Bevel	Diameter of Base of Hub
		WNF	Blind	9.5mm	12.7mm				
	D	t	t	B1		T	G	A	X
12	520	49.3	49.3	304.8	298.4	129	381.0	323.8	375
14	585	52.4	52.4	336.6	330.2	141	412.8	355.6	425
16	650	55.6	55.6	387.4	381.0	144	469.9	406.4	483
18	710	58.8	58.8	468.2	431.8	157	533.4	457.0	533
20	775	62.0	62.0	489.0	482.6	160	584.2	508.0	587
22	840	65.1	65.1	539.8	533.4	164	641.5	558.8	641
24	915	68.3	68.3	590.6	584.2	167	692.2	610.0	702
26	970	77.8	82.6	641.4	635.0	183	749.0	660.4	721
28	1035	84.2	88.9	692.2	685.8	195	800.0	711.2	775
30	1090	90.5	93.7	743.0	736.6	208	857.0	762.0	827
32	1150	96.9	98.5	793.8	787.4	221	914.0	812.8	881
34	1205	100.1	103.2	844.6	838.2	230	965.0	863.6	937
36	1270	103.2	109.6	895.4	889.0	240	1022.0	914.4	991
38	1170	106.4	106.4	946.2	939.8	179	1029.0	965.2	994
40	1240	112.8	112.8	997.0	990.6	192	1086.0	1016.0	1048
42	1290	117.5	117.5	1047.8	1041.4	198	1137.0	1066.8	1099
44	1355	122.3	122.3	1198.6	1092.2	205	1194.0	1117.6	1149
46	1415	127.0	127.0	1149.4	1143.0	214	1245.0	1168.4	1203
48	1465	131.8	131.8	1200.2	1193.8	222	1302.0	1219.2	1254
50	1530	138.2	138.2	1251.0	1244.6	230	1359.0	1270.0	1305
52	1580	142.9	142.9	1301.8	1295.4	237	1410.0	1320.8	1356
54	1660	150.9	150.9	1352.6	1346.2	251	1467.0	1371.6	1410
56	1710	152.4	152.4	1403.4	1397.0	259	1518.0	1422.4	1464
58	1760	157.2	157.2	1454.2	1447.8	265	1575.0	1473.2	1514
60	1810	162.0	162.0	1505.0	1498.6	271	1626.0	1524.0	1565

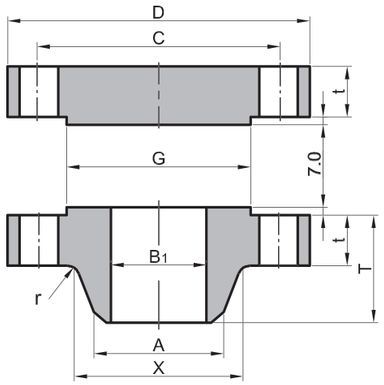
Unit : mm

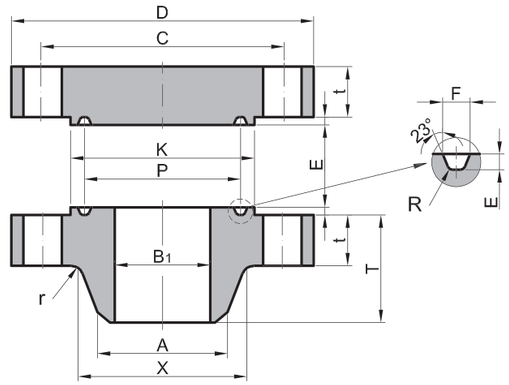
Nominal Pipe Size (inch)	Drilling			Radius of Fillet	Pitch Diameter	GROOVE DIMENSIONS			Diameter of Raised Face	Ring & Groove Number
	Diameter of Bolt Circle	Number of holes	Diameter of Bolt hole			Width	Depth	Radius		
	C			r	P	F	E	R	K	
12	450.8	16	31.8	10	381.0	11.9	7.9	0.8	413	R57
14	514.4	20	31.8	10	419.1	11.9	7.9	0.8	457	R61
16	571.5	20	35.0	10	469.9	11.9	7.9	0.8	508	R65
18	628.6	24	35.0	10	533.4	11.9	7.9	0.8	575	R69
20	685.8	24	35.0	10	584.2	13.5	9.5	1.5	635	R73
22	743.0	24	41.1	10	635.0	15.1	11.1	1.5	686	R81
24	812.8	24	41.1	10	692.2	16.7	11.1	1.5	749	R77
26	876.3	28	44.5	10	749.3	19.8	12.7	1.5	810	R93
28	939.8	28	44.5	11	800.1	19.8	12.7	1.5	861	R94
30	997.0	28	47.6	11	857.3	19.8	12.7	1.5	917	R95
32	1054.1	28	50.8	11	914.4	23.0	14.3	1.5	984	R96
34	1104.9	28	50.8	13	965.2	23.0	14.3	1.5	1035	R97
36	1168.4	32	53.8	13	1022.4	23.0	14.3	1.5	1092	R98
38	1092.2	32	41.1	13	-	-	-	-	-	-
40	1155.7	32	44.5	13	-	-	-	-	-	-
42	1206.5	32	44.5	13	-	-	-	-	-	-
44	1263.6	32	47.8	13	-	-	-	-	-	-
46	1320.8	28	50.8	13	-	-	-	-	-	-
48	1371.6	32	50.8	13	-	-	-	-	-	-
50	1428.8	32	54.0	13	-	-	-	-	-	-
52	1479.6	32	54.0	13	-	-	-	-	-	-
54	1549.4	28	60.5	13	-	-	-	-	-	-
56	1600.2	28	60.5	13	-	-	-	-	-	-
58	1651.0	32	60.5	13	-	-	-	-	-	-
60	1701.8	32	60.5	13	-	-	-	-	-	-

Notes :

(1) For the 'Bore'(B1) other than wall thickness 9.5mm and 12.7mm, refer to page 54-55.
(2) Class 150 flanges will be furnished with 1.6mm(0.06") raised face, which is excepted from 'Thickness'(t) and 'Length through Hub'(T).
(3) Flanges dimensions of size 12" through 24" flanges [except 22"] are in accordance with ASME B16.5
(4) Blind flanges mays be made with or without hubs at the manufactures's option.

CLASS 400 FLANGES





ASME B16.47 SER.A-2006 (MSS SP 44-2006)

Unit : mm

Nominal Pipe Size (inch)	Outside Diameter	Thickness		Bore wall Thickness		Length through Hub	O.D of Raised Face	Diameter of Hub Bevel	Diameter of Base of Hub
		WNF	Blind	9.5mm	12.7mm				
	D	t	t	B1		T	G	A	X
12	520	57.2	57.2	304.8	298.4	137	381	323.8	375
14	585	60.4	60.4	336.6	330.2	149	413	355.6	425
16	650	63.5	63.5	387.4	381.0	152	470	406.4	483
18	710	66.7	66.7	438.2	431.6	165	533	457.0	533
20	775	69.9	69.9	489.0	482.6	168	584	508.0	587
22	840	73.1	73.1	539.8	533.6	171	642	559.0	641
24	915	76.2	76.2	590.6	584.6	175	692	610.0	702
26	970	88.9	98.5	641.4	635.0	194	749	660.4	727
28	1035	95.3	104.8	692.2	685.8	206	800	711.2	783
30	1090	101.6	111.2	743.0	736.6	219	857	762.0	837
32	1150	108.0	115.9	793.8	787.4	232	914	812.8	889
34	1205	111.2	122.3	844.6	838.2	241	965	863.6	945
36	1270	114.3	128.6	895.4	889.0	251	1022	914.4	1000
38	1205	123.9	123.9	946.2	939.8	206	1035	965.2	1003
40	1270	130.2	130.2	997.0	990.6	216	1092	1016.0	1054
42	1320	133.4	133.4	1047.8	1041.4	224	1143	1066.8	1108
44	1385	139.7	139.7	1098.6	1092.2	233	1200	1117.6	1159
46	1440	146.1	146.1	1149.4	1143.0	244	1257	1168.4	1213
48	1510	152.4	152.4	1200.2	1193.8	257	1308	1219.2	1267
50	1570	157.2	158.8	1251.0	1244.6	268	1362	1270.0	1321
52	1620	162.0	163.6	1301.8	1295.4	276	1413	1320.8	1372
54	1700	169.9	171.5	1352.6	1346.2	289	1470	1371.6	1426
56	1755	174.7	176.3	1403.4	1397.0	298	1527	1422.4	1480
58	1805	177.8	181.0	1454.2	1447.8	306	1578	1473.2	1530
60	1885	185.8	189.0	1505.0	1498.6	319	1635	1524.0	1584

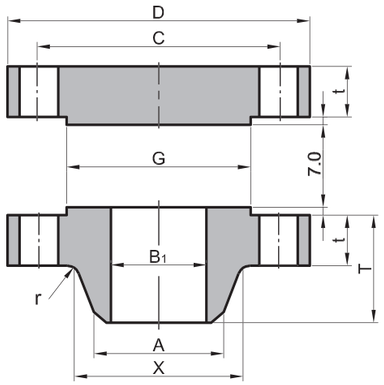
Unit : mm

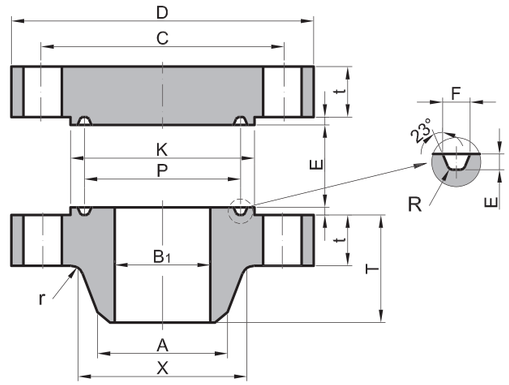
Nominal Pipe Size (inch)	Drilling			Radius of Fillet	Pitch Diameter of Hub	GROOVE DIMENSIONS			Diameter of Raised Face	Ring & Groove Number
	Diameter of Bolt Circle	Number of holes	Diameter of Bolt hole			Width	Depth	Radius		
	C			r	P	F	E	R	K	
12	450.8	16	35.1	11	381.0	11.9	7.9	0.8	413	R57
14	514.4	20	35.1	11	419.1	11.9	7.9	0.8	457	R61
16	571.5	20	38.1	11	469.9	11.9	7.9	0.8	508	R65
18	628.6	24	38.1	11	533.4	11.9	7.9	0.8	575	R69
20	685.8	24	41.1	11	584.2	13.5	9.5	1.5	635	R73
22	743.0	24	44.5	11	635.0	15.1	11.1	1.5	686	R81
24	812.8	24	47.8	11	692.2	16.7	11.1	1.5	749	R77
26	876.3	28	47.6	11	749.3	19.8	12.7	1.5	810	R93
28	939.8	28	50.8	13	800.1	19.8	12.7	1.5	861	R94
30	997.0	28	53.9	13	857.3	19.8	12.7	1.5	917	R95
32	1054.1	28	53.9	13	914.4	23.0	14.3	1.5	984	R96
34	1104.9	28	53.9	14	965.2	23.0	14.3	1.5	1035	R97
36	1168.4	32	53.9	14	1022.4	23.0	14.3	1.5	1092	R98
38	1117.6	32	47.6	14	-	-	-	-	-	-
40	1174.8	32	50.8	14	-	-	-	-	-	-
42	1125.6	32	50.8	14	-	-	-	-	-	-
44	1282.7	32	53.9	14	-	-	-	-	-	-
46	1339.8	36	53.9	14	-	-	-	-	-	-
48	1403.4	28	60.3	14	-	-	-	-	-	-
50	1460.5	32	60.3	14	-	-	-	-	-	-
52	1511.3	32	60.3	14	-	-	-	-	-	-
54	1581.2	28	66.7	14	-	-	-	-	-	-
56	1632.0	32	66.7	14	-	-	-	-	-	-
58	1682.8	32	66.7	14	-	-	-	-	-	-
60	1752.6	32	73.0	14	-	-	-	-	-	-

Notes :

(1) For the 'Bore'(B1) other than wall thickness 9.5mm and 12.7mm, refer to page 54-55.
(2) Class 400 flanges will be furnished with 1.6mm(0.06") raised face, which is excepted from 'Thickness'(t) and 'Length through Hub'(T).
(3) Flanges dimensions of size 12" through 24" flanges [except 22"] are in accordance with ASME B16.5
(4) Blind flanges mays be made with or without hubs at the manufactures's option.

CLASS 600 FLANGES





ASME B16.47 SER.A-2006 (MSS SP 44-2006)

Unit : mm

Nominal Pipe Size (inch)	Outside Diameter	Thickness		Bore wall Thickness		Length through Hub	O.D of Raised Face	Diameter of Hub Bevel	Diameter of Base of Hub
		WNF	Blind	9.5mm	12.7mm				
	D	t	t	B1		T	G	A	X
12	560	66.7	66.5	304.8	298.4	156	381.0	323.8	400
14	605	69.9	69.9	336.6	330.2	165	412.8	355.6	432
16	685	76.2	76.2	387.4	381.0	178	469.9	406.4	495
18	745	82.6	82.6	438.2	431.6	184	533.4	457.0	546
20	815	88.9	88.9	489.0	482.6	190	584.2	508.0	610
22	870	95.3	95.3	539.8	533.6	197.0	641.4	559.0	667
24	940	101.6	101.6	590.6	584.6	203.0	692.2	610.0	718
26	1015	108.0	125.5	641.4	635.0	222.0	749	660.4	748
28	1075	111.2	131.8	692.2	685.8	235.0	800	711.2	803
30	1130	114.3	139.7	743.0	736.6	248.0	857	762.0	862
32	1195	117.5	147.7	793.8	787.4	260.0	914	812.8	918
34	1245	120.7	154.0	844.6	838.2	270.0	965	863.6	973
36	1315	123.9	162.0	895.4	889.0	283.0	1022	914.4	1032
38	1270	152.4	155.0	946.2	939.8	254.0	1054	965.2	1022
40	1320	158.8	162.0	997.0	990.6	264.0	1111	1016.0	1073
42	1405	168.3	171.5	1047.8	1041.4	279.0	1168	1066.8	1127
44	1455	173.1	177.8	1098.6	1092.2	289.0	1226	1117.6	1181
46	1510	179.4	185.8	1149.4	1143.0	300.0	1276	1168.4	1235
48	1595	189.0	195.3	1200.2	1193.8	316.0	1334	1219.2	1289
50	1670	196.9	203.2	1251.0	1244.6	329.0	1384	1270.0	1343
52	1720	203.2	209.6	1301.8	1295.4	337.0	1435	1320.8	1394
54	1780	209.6	217.5	1352.6	1346.2	349.0	1492	1371.6	1448
56	1855	217.5	225.5	1403.4	1397.0	362.0	1543	1422.4	1502
58	1905	222.3	231.8	1454.2	1447.8	370.0	1600	1473.2	1553
60	1995	233.4	242.9	1505.0	1498.6	389.0	1657	1524.0	1610

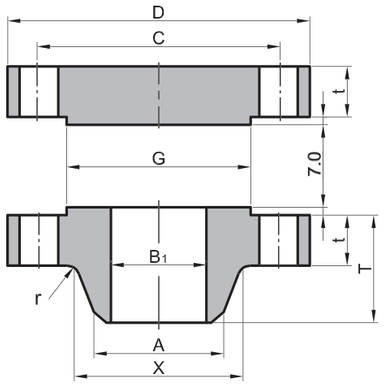
Unit : mm

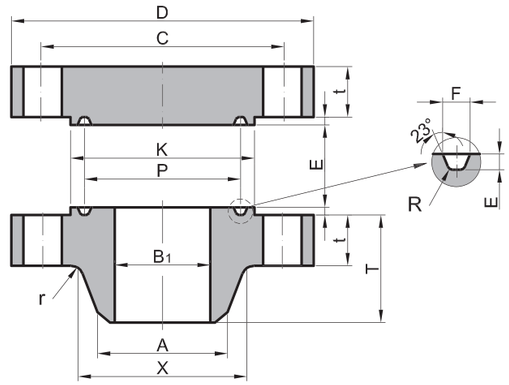
Nominal Pipe Size (inch)	Drilling			Radius of Fillet	Pitch Diameter	GROOVE DIMENSIONS			Diameter of Raised Face	Ring & Groove Number
	Diameter of Bolt Circle	Number of holes	Diameter of Bolt hole			Width	Depth	Radius		
	C			r	P	F	E	R	K	
12	489.0	20	35.1	11	381.0	11.9	7.9	0.8	413	R57
14	527.0	20	38.1	11	419.1	11.9	7.9	0.8	457	R61
16	603.2	20	41.1	11	469.9	11.9	7.9	0.8	508	R65
18	654.0	20	44.5	11	533.4	11.9	7.9	0.8	575	R69
20	723.9	24	44.5	11	584.2	13.5	9.5	1.5	635	R73
22	777.8	24	47.8	11	635.0	15.1	11.1	1.5	686	R81
24	838.2	24	50.8	11	692.2	16.7	11.1	1.5	749	R77
26	914.4	28	50.8	13	749.3	19.8	12.7	1.5	810	R93
28	965.2	28	54.0	13	800.1	19.8	12.7	1.5	861	R94
30	1022.4	28	54.0	13	857.3	19.8	12.7	1.5	917	R95
32	1079.5	28	60.3	13	914.4	23.0	14.3	1.5	984	R96
34	1130.3	28	60.3	14	965.2	23.0	14.3	1.5	1035	R97
36	1193.8	28	66.7	14	1022.4	23.0	14.3	1.5	1092	R98
38	1162.0	28	60.3	14	-	-	-	-	-	-
40	1212.8	32	60.3	14	-	-	-	-	-	-
42	1282.7	28	66.7	14	-	-	-	-	-	-
44	1333.5	32	66.7	14	-	-	-	-	-	-
46	1390.6	32	66.7	14	-	-	-	-	-	-
48	1460.5	32	73.0	14	-	-	-	-	-	-
50	1524.0	28	79.4	14	-	-	-	-	-	-
52	1574.8	32	79.4	14	-	-	-	-	-	-
54	1632.0	32	79.4	14	-	-	-	-	-	-
56	1695.4	32	85.7	16	-	-	-	-	-	-
58	1746.2	32	85.7	16	-	-	-	-	-	-
60	1822.4	28	92.1	17	-	-	-	-	-	-

Notes :

(1) For the 'Bore'(B1) other than wall thickness 9.5mm and 12.7mm, refer to page 54-55.
(2) Class 400 flanges will be furnished with 1.6mm(0.06") raised face, which is excepted from 'Thickness'(t) and 'Length through Hub'(T).
(3) Flanges dimensions of size 12" through 24" flanges [except 22"] are in accordance with ASME B16.5
(4) Blind flanges mays be made with or without hubs at the manufactures's option.

CLASS 900 FLANGES





ASME B16.47 SER.A-2006 (MSS SP 44-2006)

Unit : mm

Nominal Pipe Size (inch)	Outside Diameter	Thickness		Length thru Hub	O.D of Raised Face	Diameter of Hub Bevel	Diameter of Base of Hub	Drilling		
		WNF	Blind					Diameter of Bolt Circle	Number of holes	Diameter of Bolt hole
	D	t	t	T	G	A	X	C		
12	610	79.4	79.4	200	381.0	323.8	419	533.4	20	38.1
14	640	85.8	85.8	213	412.8	355.6	451	558.8	20	41.1
16	705	88.9	88.9	216	469.9	406.4	508	616.0	20	44.5
18	785	101.6	101.6	229	533.4	457.0	565	685.8	20	50.8
20	855	108.0	108.0	248	584.2	508.0	622	749.3	20	53.8
24	1040	139.7	139.7	292	692.2	610.0	749	901.7	20	66.5
26	1085	139.7	160.4	286	749	660.4	775	952.5	20	73.0
28	1170	142.9	171.5	298	800	711.2	832	1022.4	20	79.4
30	1230	149.3	182.6	311	857	762.0	889	1085.8	20	79.4
32	1315	158.8	193.7	330	914	812.8	946	1155.7	20	85.7
34	1395	165.1	204.8	349	965	863.6	1006	1225.6	20	92.1
36	1460	171.5	214.4	362	1022	914.4	1064	1289.0	20	92.1
38	1460	190.5	215.9	352	1099	965.2	1073	1289.0	20	92.1
40	1510	196.9	223.9	364	1162	1016.0	1127	1339.8	24	92.1
42	1560	206.4	231.8	371	1213	1066.8	1176	1390.6	24	92.1
44	1650	214.4	242.9	391	1270	1117.6	1235	1463.7	24	98.4
46	1735	225.5	255.6	411	1334	1168.4	1292	1536.7	24	104.8
48	1785	233.4	263.6	419	1384	1219.2	1343	1587.5	24	104.8

Unit : mm

Nominal Pipe Size (inch)	Radius of Fillet	Bore wall Thickness		Pitch Diameter	GROOVE DIMENSIONS			Diameter of Raised Face	Ring & Groove Number
		9.5mm	12.7mm		Width	Depth	Radius		
	r	B1		P	F	E	R	K	
12	11	304.8	298.4	381.0	11.9	7.9	0.8	419	R57
14	11	336.6	330.2	419.1	16.7	11.1	1.5	467	R62
16	11	387.4	381.0	469.9	16.7	11.1	1.5	524	R66
18	11	438.2	431.6	533.4	19.8	12.7	1.5	594	R70
20	11	489.0	482.6	584.2	19.8	12.7	1.5	648	R74
24	11	590.6	584.6	692.2	27.0	15.9	2.3	772	R78
26	11	641.4	635.0	749.3	30.2	17.5	2.3	832	R100
28	13	692.2	685.8	800.1	33.3	17.5	2.3	889	R101
30	13	743.0	736.6	857.3	33.3	17.5	2.3	946	R102
32	13	793.8	787.4	914.4	33.3	17.5	2.3	1003	R103
34	14	844.6	838.2	965.2	36.5	20.6	2.3	1067	R104
36	14	895.4	889.0	1022.4	36.5	20.6	2.3	1124	R105
38	19	946.2	939.8	-	-	-	-	-	-
40	21	997.0	990.6	-	-	-	-	-	-
42	21	1047.8	1041.4	-	-	-	-	-	-
44	22	1098.6	1092.2	-	-	-	-	-	-
46	22	1149.4	1143.0	-	-	-	-	-	-
48	24	1200.2	1193.8	-	-	-	-	-	-

Notes :

(1) For the 'Bore'(B1) other than wall thickness 9.5mm and 12.7mm, refer to page 54-55.
(2) Class 900 flanges will be furnished with 1.6mm(0.06") raised face, which is excepted from 'Thickness'(t) and 'Length through Hub'(T).
(3) Flanges dimensions of size 12" through 24" flanges [except 22"] are in accordance with ASME B16.5
(4) Blind flanges mays be made with or without hubs at the manufactures's option.

MSS SP-44-2006

FORGED FLANGES TOLERANCE

Place		Range		Tolerance (mm)
Outside Diameter	D			±3.2* (±0.125in*)
Inside Diameter	B1		12 ≤ NPS ≤ 18	±1.5(±0.06in)
			NPS ≥ 20	+3.0 (+0.12in) -1.5 (-0.06in)
	G	2.0mm Raised Face	12 ≤ NPS ≤ 24	±1.0(±0.03in)
			NPS ≥ 26	±2.0(±0.08in)
		7.0mm Raised Face	12 ≤ NPS ≤ 24	±0.5(±0.02in)
			NPS ≥ 26	±1.0(±0.04in)
Diameter of Hub at Base	X			±3.2* (±0.125in*)
Diameter of Hub at Welding Point	A		12 ≤ NPS ≤ 24	+4.0 (+0.16in) -1.0 (-0.03in)
			NPS ≥ 26	+5.0 (+0.21in) -1.5 (-0.06in)
Drilling	Bolt Circle Diameter			±1.5(±0.06in)
	Bolt to Bolt Hole			±0.8(±0.03in)
	Eccentricity of Bolt Circle with Respect to Facing		12 ≤ NPS ≤ 24	±1.5(±0.06in)
			NPS ≥ 26	±2.0(±0.09in)
Thickness	t	NPS ≤ 18		+3.0 (+0.12in) -0.0 (-0.00in)
		NPS ≥ 20		+5.0 (+0.19in) -0.0 (-0.00in)
Length Thru Hub	T		12 ≤ NPS ≤ 24	+3.0 (+0.12in) -5.0 (-0.18in)
			NPS ≥ 26	±5.0(±0.19in)

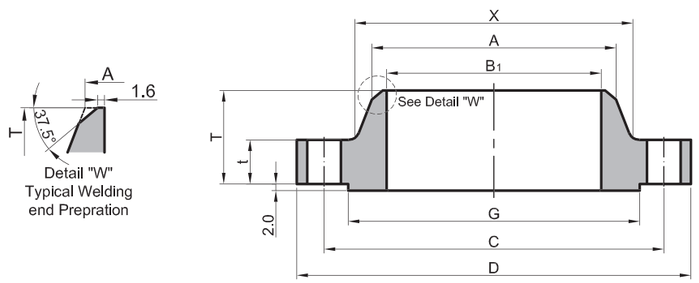
Notes :
Sizes NPS 10 and smaller
Tolerances for these sizes shall be as specified in ASME B 16.5. The listing of decimal tolerances does not imply method of measurement

ASME B16.47 SER. B-2006

API 605 FLANGES-1988



CLASS 75/150 FLANGES



CLASS 75

Unit : mm

Nominal Pipe Size	Outside Diam.	O.D Raised Face	Diam. of Hub at Base	Diam. of Hub at Bevel	BORE Wall thickness			Length Thru Hub	THICKNESS		Radius at Base of Hub	DRILLING			Approximate Weight(kg)	
					6.35mm	9.5mm	12.7mm		Welding Neck	Blind		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Welding Neck	Blind
	D	G	X	A	B1			T1	t	t	r	C				
26	760	705	676	661.9	647.7	641.4	635.0	57	31.9	31.9	8	723.9	36	19.1	29.0	110.9
28	815	756	727	712.7	698.5	692.2	685.8	60	31.9	31.9	8	774.7	40	19.1	31.0	131.5
30	865	806	778	763.5	749.3	743.0	736.6	64	31.9	31.9	8	825.5	44	19.1	35.1	149.7
32	915	857	829	814.3	800.1	793.8	787.4	68	33.5	35.0	8	876.3	48	19.1	48.0	176.9
34	965	908	879	865.1	850.9	844.6	838.2	72	33.5	36.6	8	927.1	52	19.1	50.0	195.0
36	1035	965	935	915.9	901.7	895.4	889.0	84	35.0	40.9	10	992.2	40	22.2	62.1	235.0
38	1085	1016	986	966.7	952.5	946.2	939.8	87	36.6	43.0	10	1043.0	40	22.2	70.1	269.9
40	1135	1067	1037	1017.5	1003.3	997.0	990.6	91	36.6	43.0	10	1093.8	44	22.2	74.1	344.7
42	1185	1118	1087	1068.3	1054.1	1047.8	1041.4	94	38.2	46.3	10	1144.6	48	22.2	77.1	406.0
44	1250	1175	1140	1119.1	1104.9	1098.6	1092.2	103	41.4	47.7	10	1203.3	36	25.4	82.1	483.1
46	1300	1226	1191	1169.9	1155.7	1149.4	1143.0	106	43.0	49.3	10	1254.1	40	25.4	105.0	537.5
48	1355	1276	1241	1220.7	1206.5	1200.2	1193.8	110	44.6	52.5	10	1304.9	44	25.4	120.0	596.5
50	1405	1327	1294	1271.5	1257.3	1251.0	1244.6	114	46.2	54.1	10	1355.7	44	25.4	134.3	682.7
52	1455	1378	1345	1322.3	1308.1	1301.8	1295.4	119	46.2	55.7	10	1409.7	48	25.4	142.2	755.2
54	1510	1429	1397	1373.1	1358.9	1352.6	1346.2	124	47.8	58.9	10	1460.5	48	25.4	180.2	834.6
56	1575	1486	1451	1423.9	1409.7	1403.4	1397.0	133	49.3	60.4	11	1520.8	40	28.6	184.6	957.1
58	1625	1537	1502	1474.7	1460.5	1454.2	1447.8	137	50.9	62.0	11	1571.6	44	28.6	195.6	1043.3
60	1675	1588	1553	1525.5	1511.3	1505.0	1498.6	143	54.1	65.2	11	1622.4	44	28.6	210.2	1134.0

CLASS 150

Unit : mm

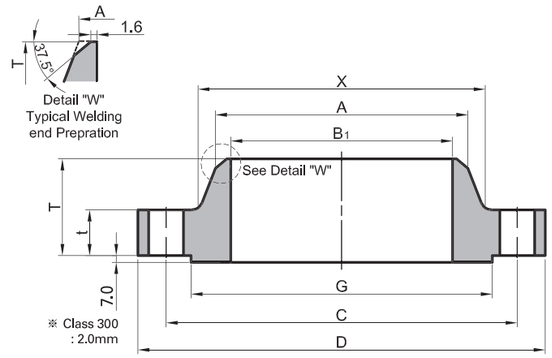
Nominal Pipe Size	Outside Diam.	O.D Raised Face	Diam. of Hub at Base	Diam. of Hub at Bevel	BORE Wall thickness			Length Thru Hub	THICKNESS		Radius at Base of Hub	DRILLING			Approximate Weight(kg)	
					6.35mm	9.5mm	12.7mm		Welding Neck	Blind		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Welding Neck	Blind
	D	G	X	A	B1			T1	t	t	r	C				
26	785	711	684	661.9	647.7	641.4	635.0	87	39.8	43.0	10	744.5	36	22.2	54.4	169.2
28	835	762	735	712.7	698.5	692.2	685.8	94	43.0	46.2	10	795.3	40	22.2	63.5	205.9
30	885	813	787	763.5	749.3	743.0	736.6	98	43.0	49.3	10	846.1	44	22.2	68.0	246.3
32	940	864	840	814.3	800.1	793.8	787.4	106	44.6	52.5	10	900.1	48	22.2	77.1	293.9
34	1005	921	892	865.1	850.9	844.6	838.2	109	47.7	55.7	10	957.3	40	25.4	95.3	355.2
36	1055	972	945	915.9	901.7	895.4	889.0	116	50.9	57.3	10	1009.6	44	25.4	108.9	403.7
38	1125	1022	997	968.2	952.5	946.2	939.8	122	52.5	62.0	10	1070.0	40	28.6	131.5	494.0
40	1175	1080	1049	1019.0	1003.3	997.0	990.6	127	54.1	65.2	10	1120.8	44	28.6	140.6	565.6
42	1225	1130	1102	1069.8	1054.1	1047.8	1041.4	132	57.3	66.8	11	1171.6	48	28.6	156.5	631.9
44	1275	1181	1153	1120.6	1104.9	1098.6	1092.2	135	58.9	70.0	11	1222.4	52	28.6	167.8	716.2
46	1340	1235	1205	1171.4	1155.7	1149.4	1143.0	143	60.4	73.1	11	1284.3	40	31.8	197.3	827.4
48	1390	1289	1257	1222.2	1206.5	1200.2	1193.8	148	63.6	76.3	11	1335.1	44	31.8	217.7	927.6
50	1445	1340	1308	1273.0	1257.3	1251.0	1244.6	152	66.8	79.5	11	1385.9	48	31.8	235.9	1036.0
52	1495	1391	1360	1323.8	1308.1	1301.8	1295.4	156	68.4	82.7	11	1436.7	52	31.8	249.5	1155.3
54	1550	1441	1413	1374.6	1358.9	1352.6	1346.2	160	70.0	85.8	11	1492.2	56	31.8	281.2	1291.9
56	1600	1492	1465	1425.4	1409.7	1403.4	1397.0	165	71.6	89.0	14	1543.0	60	31.8	294.8	1426.1
58	1675	1543	1516	1476.2	1460.5	1454.2	1447.8	173	73.1	91.9	14	1611.3	48	34.9	353.8	1614.8
60	1725	1600	1570	1527.0	1511.3	1505.0	1498.6	178	74.7	95.4	14	1662.1	52	34.9	385.6	1774.9

Notes :

(1) 'Bore'(B1) of flanges is shall be specified by the purchaser.

(2) The flange Thickness(t) & Length through Hub(T1) does not include the raised face thickness.

CLASS 300/400 FLANGES



CLASS 300

Unit : mm

Nominal Pipe Size	Outside Diam.	O.D Raised Face	Diam. of Hub at Base	Diam. of Hub at Bevel	BORE Wall thickness			Length Thru Hub	THICKNESS		Radius at Base of Hub	DRILLING			Approximate Weight(kg)	
					6.35mm	9.5mm	12.7mm		Welding Neck	Blind		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Welding Neck	Blind
	D	G	X	A	B1			T1	t	t	r	C				
26	865	737	702	665.2	647.7	641.4	635.0	143	87.4	87.4	14	803.3	32	34.9	200.2	411.4
28	920	787	756	716.0	698.5	692.2	685.8	148	87.4	87.4	14	857.2	36	34.9	210.2	464.0
30	990	845	813	768.4	749.3	743.0	736.6	156	92.1	92.1	14	920.8	36	38.1	270.2	566.5
32	1055	902	864	819.2	800.1	793.8	787.4	167	101.6	101.6	16	977.9	32	41.3	330.3	705.8
34	1110	953	918	870.0	860.9	844.6	838.2	171	101.6	101.6	16	1031.9	36	41.3	360.3	779.7
36	1170	1010	965	920.8	901.7	895.4	889.0	179	101.6	101.6	16	1089.0	32	44.5	410.4	871.4
38	1220	1060	1016	971.6	952.5	946.2	939.8	191	109.6	109.6	16	1139.8	36	44.5	570.5	1023.8
40	1275	1114	1067	1022.4	1003.3	997.0	990.6	197	114.3	114.3	16	1190.6	40	44.5	660.6	1156.2
42	1335	1168	1118	1074.7	1054.1	1047.8	1041.4	203	117.5	117.5	16	1244.6	36	47.6	720.6	1304.6
44	1385	1219	1173	1125.5	1104.9	1098.6	1092.2	213	125.5	125.5	16	1295.4	40	47.6	800.7	1498.7
46	1460	1270	1229	1176.3	1155.7	1149.4	1143.0	221	127.0	128.6	16	1365.2	36	50.8	970.9	1708.3
48	1510	1327	1278	1227.1	1206.5	1200.2	1193.8	222	127.0	133.4	16	1416.0	40	50.8	990.9	1897.4
50	1560	1378	1330	1277.9	1257.3	1251.0	1244.6	233	136.6	138.2	16	1466.8	44	50.8	1047.9	2099.7
52	1615	1429	1383	1328.7	1308.1	1301.8	1295.4	241	141.3	142.6	16	1517.6	48	50.8	1113.8	2311.5
54	1675	1480	1435	1379.5	1358.9	1352.6	1346.2	238	135.0	147.7	16	1578.0	48	50.8	1161.0	2575.5
56	1765	1537	1494	1430.3	1409.7	1403.4	1397.0	267	152.4	155.4	17	1651.0	36	60.3	1336.1	3012.8
58	1825	1594	1548	1481.1	1460.5	1454.2	1447.8	273	152.4	160.4	17	1712.9	40	60.3	1427.6	3332.6
60	1880	1651	1599	1557.3	1511.3	1505.0	1498.6	270	149.3	165.1	17	1763.7	40	60.3	1451.3	3619.7

CLASS 400

Unit : mm

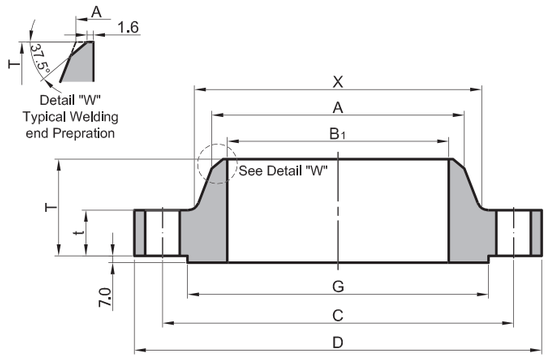
Nominal Pipe Size	Outside Diam.	O.D Raised Face	Diam. of Hub at Base	Diam. of Hub at Bevel	BORE Wall thickness			Length Thru Hub	THICKNESS		Radius at Base of Hub	DRILLING			Approximate Weight(kg)	
					6.35mm	9.5mm	12.7mm		Welding Neck	Blind		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Welding Neck	Blind
	D	G	X	A	B1			T1	t	t	r	C				
26	850	711	689	660.4	647.7	641.4	635.0	149	88.9	88.9	11	781.0	28	38.1	163.3	396.4
28	915	762	740	711.2	698.5	692.2	685.8	159	95.3	95.3	13	838.2	24	41.3	204.1	490.3
30	970	819	794	762.0	749.3	743.0	736.6	170	101.6	101.6	13	895.4	28	41.3	240.4	590.6
32	1035	873	845	812.8	800.1	793.8	787.4	179	108.0	108.0	13	952.5	28	44.5	288.0	712.2
34	1085	927	899	863.6	850.9	844.6	838.2	187	111.2	111.2	14	1003.3	32	44.5	313.0	807.9
36	1155	981	952	914.4	901.7	895.4	889.0	200	119.1	119.1	14	1066.8	28	47.6	387.8	979.8

Notes :

(1) 'Bore'(B1) of flanges is shall be specified by the purchaser.

(2) The flange Thickness(t) & Length through Hub(T1) does not include the raised face thickness.

CLASS 600/900 FLANGES



CLASS 600

Unit : mm

Nominal Pipe Size	Outside Diam.	O.D Raised Face	Diam. of Hub at Base	Diam. of Hub at Bevel	BORE Wall thickness 6.35mm	BORE Wall thickness 9.5mm	BORE Wall thickness 12.7mm	Length Thru Hub	THICKNESS Welding Neck	THICKNESS Blind	Radius at Base of Hub	DRILLING Bolt Circle Diam.	DRILLING Num. of Holes	DRILLING Diam. of Holes	Approximate Weight(kg) Welding Neck	Approximate Weight(kg) Blind
	D	G	X	A	B1			T1	t	t	r	C				
26	890	727	698	660.4	647.7	641.4	635.0	181	111.2	111.3	13	806.4	28	44.5	249.5	541.6
28	950	784	752	711.2	698.5	692.2	685.8	190	115.9	115.9	13	863.6	28	47.6	294.8	647.3
30	1020	841	806	762.0	749.3	743.0	736.6	205	125.5	127.0	13	927.1	28	50.8	367.4	817.4
32	1085	895	860	812.8	800.1	793.8	787.4	216	130.2	134.9	13	984.2	28	54.0	430.9	979.3
34	1160	953	914	863.6	850.9	844.6	838.2	233	141.3	144.2	14	1054.1	24	60.3	546.6	1199.8
36	1215	1010	968	914.4	901.7	895.4	889.0	243	146.1	150.9	14	1104.9	28	60.3	607.8	1366.7

CLASS 900

Unit : mm

Nominal Pipe Size	Outside Diam.	O.D Raised Face	Diam. of Hub at Base	Diam. of Hub at Bevel	BORE Wall thickness 6.35mm	BORE Wall thickness 9.5mm	BORE Wall thickness 12.7mm	Length Thru Hub	THICKNESS Welding Neck	THICKNESS Blind	Radius at Base of Hub	DRILLING Bolt Circle Diam.	DRILLING Num. of Holes	DRILLING Diam. of Holes	Approximate Weight(kg) Welding Neck	Approximate Weight(kg) Blind
	D	G	X	A	B1			T1	t	t	r	C				
26	1020	762	743	660.4	647.7	641.4	635.0	259	135.0	154.0	11	901.7	20	66.7	476.3	990.7
28	1105	819	797	711.2	698.5	692.2	685.8	276	147.7	166.7	13	971.6	20	73.0	689.5	1251.8
30	1180	876	851	762.0	749.3	743.0	736.6	289	155.6	176.1	13	1035.0	20	79.4	825.6	1512.3
32	1240	927	908	812.8	800.1	793.8	787.4	303	160.4	186.0	13	1092.2	20	79.4	936.7	1753.2
34	1315	991	962	863.6	850.9	844.6	838.2	319	171.5	195.0	14	1155.7	20	85.7	1111.3	2075.7
36	1345	1029	1016	914.4	901.7	895.4	889.0	325	173.1	201.7	14	1200.2	24	79.4	1143.1	2251.2

Notes :

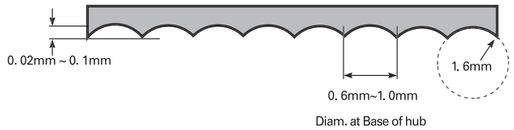
(1) 'Bore'(B1) of flanges is shall be specified by the purchaser.
(2) The flange Thickness(t) & Length through Hub(T1) does not include the raised face thickness.

FINISH & TOLERANCE

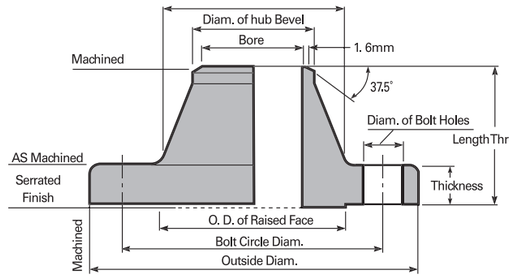
API 605 - 1988 FORGED FLANGES

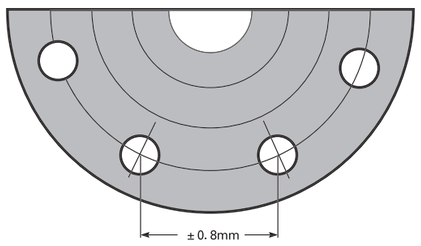
1. Standard Finishes for Contact Face of Flanges

The flange face shall have a serrated finish consisting of 20 to 40 goroves per inch, 0.002 in. to 0.005 in. deep, cut spirally or concentrically with a round-nose tool.



2. Dimensional Tolerances for ASME B16.47 SER. B Flanges





Notes :

(1) Flanges shall have bearing surfaces for bolting that are parallel to the flange face within 1 degree. Any back facing or spot facing required to accomplish parallelism between the flange face and nut bearing surface on the back of the flange shall not reduce the flange thickness.

(2) Tolerances for the welding end of a welding neck flange shall be in conformance with ASME B12.25

(3) Other tolerances than specified the table shall be in accordance with ASME B16.5

(4) The Flange shall be either back-faced of spot-faced at the bolt-holes on the flange back if the nut bearing surface at the back of the flange is not parallel with the flange face within the tolerances listed in Note(1), if the fillet at the hub interferes with the nut bearing surface or if the flange thickness exceeds the minimum required thickness by more than 0.19 inch(4.8mm).

The nut bearing surface is the spot-facing diameter at the bolt-holes as given in MSS SP-9. Spot-facing shall be in accordance with MSS SP-9.

(5) Tolerance marked * are not covered in ASME B16.47 SER.B

Range	Tolerance (mm)
Outside diameter of Raised Face	±0.8 (±0.03in)
Flange Thickness	+4.8 (+0.19in) -0.0 (-0.00in)
Length Thru Hub	±3.2 (±0.12in)
Diameter of Hub at bevel	+4.0 (+0.16in) -0.8 (-0.03in)
Bolt Circle Diameter	±1.6 (±0.06in)
Center to Center of adjacent bolt holes	±0.8 (±0.03in)
Bore	+3.0 (+0.12in) -1.6 (-0.06in)
Outside diameter	±3.0 (±0.12in)*
Diameter of Base of Hub	±3.0 (±0.12in)*

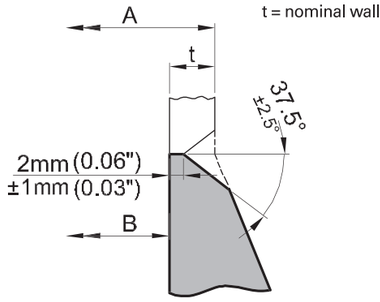
ASME B16.47-2006 TOLERANCE

Place	Range	Tolerance (mm)
Outside Diameter		±3.2* (±0.125in*)
Inside Diameter		+3.0 (+0.12in) -2.0 (-0.06in)
Facing	Outside diameter of Raised Face	±2.0(±0.08in)
	2.0mm Raised Face	±0.5(±0.02in)
	7.0mm Raised Face	±2.0(±0.08in)
Diameter of Hub at Base		±3.2* (±0.125in*)
Diameter of Hub at Welding Point		+5.0 (+0.19in) -2.0 (-0.06in)
Drilling		±1.5(±0.06in)
		±0.8(±0.03in)
		±1.5(±0.06in)
Thickness	t ≤ 25mm (1.0in)	+3.0 (+0.12in) -0.0 (-0.00in)
	25mm (1.0in)< t ≤ 50mm (2.0in)	+5.0 (+0.19in) -0.0 (-0.00in)
	50mm (2.0in)< t ≤ 75mm (3.0in)	+8.0 (+0.31in) -0.0 (-0.00in)
	t > 75mm (3.0in)	+10.0 (+0.38in) -0.0 (-0.00in)
Length Thru Hub		+3.0 (+0.12in) -5.0 (-0.19in)

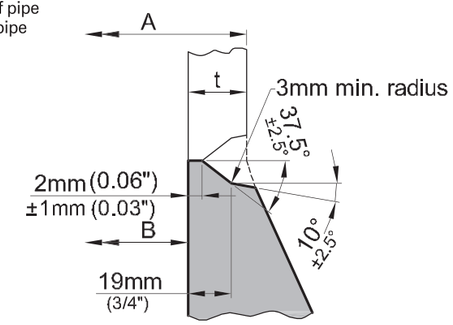
WELDING ENDS

ASME B16.47 FORGED FLANGES

A = nominal outside diameter of pipe
B = nominal inside diameter of pipe
t = nominal wall thickness of pipe



Bevel for Wall Thickness t
From 5mm (0.19in) to 22mm (0.88in) inclusive



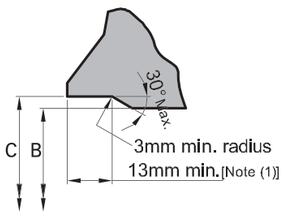
Bevel for Wall Thickness t
Greater Than 22mm (0.88in)

Notes :

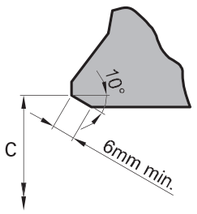
When the thickness of the hub at the bevel is greater than that of the pipe to which the flange is joined and the additional thickness is provided on the outside diameter, a raper weld having a slope not exceeding 1 to 3may be employed or, alternatively, the greater outside diameter may be tapered at the same maximum slope or less, from a point on the welding bevel equal to the outside diameter of 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 t 3.

When flanges covered by this standard are intended for services with light wall, higher strength pipe, the thickness of the hub at 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 t 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.



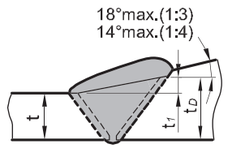
(a)Inside Contour for Use With Rectangular Backing Ring



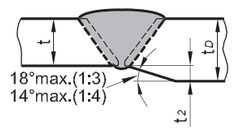
Inside Contour for Use With Taper Backing Ring

- A = nominal outside diameter of welding end, mm
- B = nominal inside diameter of pipe(=A-2t),mm
- C= A -0.79 - 1.75t - 0.25, mm
- t = niminal wall thickness of pipe, mm
- 0.79mm = minus tolerance on outside diameter of pope to ASTM A106, etc.
- 1.75t = 87.5% of nominal wall (permitted by ASTM A106,etc.) multiplied by to conver into terms of daimeter
- 0.25mm = plus tolerance on diameter C, mm.

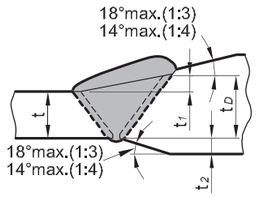
Note (1) 13mm depth based on use of 19mm wide backing ning



(a)Bevel for Outside Thickness



(b)Bevel for inside Thickness



(c)Bevel for Conbined Thickness

Notes :

(1) When the materials joined have equal minimum specified yield strength, there shall be no restriction on the minimum slope.
(2) Neither t1, t2, nor their sum(t1 + t2) shall exceed 0.5t.
(3) When the minimum specified yield strengths of the sections to be joined are unequal, the value of tD shall at least equal times the ratio of minimum specified yield strength of the pipe to minimum specified yield strength of the flange.

STEEL LINE BLANKS

ASME B16.48-1997



STEEL LINE BLANKS

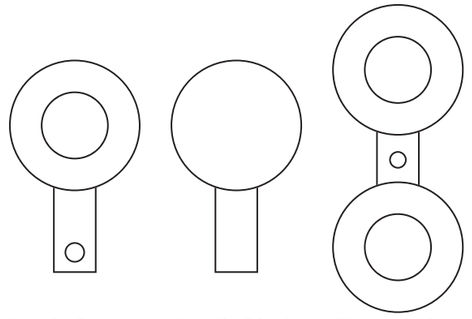
ASME B16.48-1997

1. General

a. Figure 8 Blank
A figure 8 blank(also called a spectacle blank) is a pressure retaining plate with one solid end and one open end connected with a web or tie bar

b. Paddle Blank
A paddle blank is similar to the solid end of a figure 8 blank(with handle) and is generally used in conjunction with a paddle spacer in large sizes.

c. Paddle Spacer
A paddle spacer is similar to the open end of a figure 8 blank(with handle) and is generally used in conjunction with a paddle blank.



Paddle Spacer Paddle Blank Figure 8 Blank

2. MATERIAL

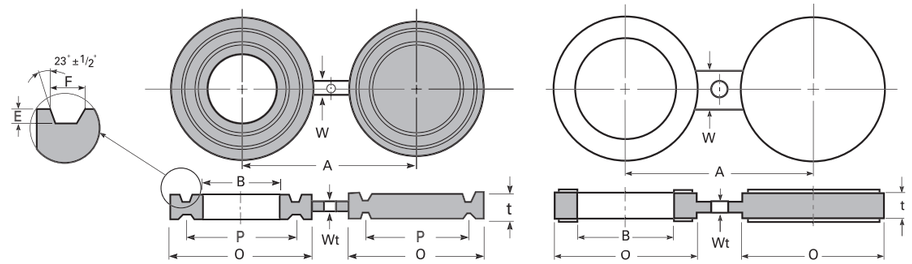
Material Group	Forgings	Plate	Castings
1.1	A105(1)	A515 Gr.70(1)	A216 Gr. WCB(1)
		A516 Gr.70(1)(2)	
		A537 Cl.1(3)	
1.7	A182 Gr.F2(4)	A204 Gr.C(5)	-
1.9	A182 Gr.F11 Cl.2(6)	A387 Gr.11 Cl.2(7)	A217 Gr. WC6(8)
1.10	A182 Gr.F22 Cl.3(7)	A387 Gr.22 Cl.2(7)	A217 Gr. WC9(8)
1.13	A182 Gr.F5	-	-
2.1	A182 Gr.F304(9)	A240 Gr. 304(9)	A351 Gr. CF8(9)
2.2	A182 Gr.F316(9)	A240 Gr. 316(9)	A351 Gr. CF8M(9)
2.4	A182 Gr.F321(4)	A240 Gr. 321(4)	-
2.5	A182 Gr.F347(4)	A240 Gr. 347(4)	A351 Gr. CF8C(9)

Notes :
(1) Upon prolonged exposure to temperatures above 427, the carbide phase of carbon steel may be converted to graphite. Permissible but not recommended for prolonged service above 427
(2) Not to be used over 454
(3) Not to be used over 371
(4) Not to be used above 538
(5) Upon prolonged exposure to temperatures above 468, the carbide phase of carbon-molyb-denum steel may be converted to graphite. Permissible but not recommended for prolonged service above 468
(6) Permissible but not recommended for prolonged use above 593. Use normalized and tempered material only.
(7) Permissible but not recommended for prolonged use above 593
(8) Not to be used over 593. Use normalized and tempered material only.
(9) At temperatures over 538, use the material only when the carbon content is 0.04% or higher.

3. TOLERANCE

Tolerance for facings shall be in accordance with ASME B16.5. Thickness tolerances are:
NPS 18 and smaller +3 / -0
NPS 20 and lorger +4.8 / -0

CLASS 150/300 FLANGES



Class 150 FIGURE 8 BLANK RAISED FACE & FEMALE RING-JOINT FACING

Unit : mm

Nominal Pipe Size	SPECTACLE RAISED FACE						SPECTACLE RING JOINT FACING								
	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Hole Diam.	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Pitch Diam.	Width of Groove	Depth of Groove	Hole Diam.
	B	O	A	t	W		B	O	A	t	W	P	F	E	
1/2	15.7	44.5	60.5	3.0	38.1	15.7	-	-	-	-	-	-	-	-	-
3/4	20.8	53.8	69.9	3.0	38.1	15.7	-	-	-	-	-	-	-	-	-
1	26.7	63.5	79.2	3.0	38.1	15.7	33.5	63.5	79.2	19.1	50.8	47.6	8.7	6.4	15.7
1 1/4	42.2	73.2	88.9	6.4	38.1	15.7	42.2	73.2	88.9	19.1	50.8	57.2	8.7	6.4	15.7
1 1/2	48.3	82.6	98.6	6.4	38.1	15.7	48.3	82.6	98.6	19.1	57.2	65.1	8.7	6.4	15.7
2	60.5	101.6	120.7	6.4	50.8	19.1	60.5	101.6	120.7	19.1	57.2	82.6	8.7	6.4	19.1
2 1/2	73.2	120.7	139.7	6.4	50.8	19.1	73.2	120.7	139.7	22.4	57.2	101.6	8.7	6.4	19.1
3	88.9	133.4	152.4	6.4	63.5	19.1	88.9	133.4	152.4	22.4	57.2	114.3	8.7	6.4	19.1
3 1/2	101.6	158.8	177.8	9.7	63.5	19.1	101.6	153.9	177.8	22.4	63.5	131.8	8.7	6.4	19.1
4	114.3	171.5	190.5	9.7	63.5	19.1	114.3	171.5	190.5	22.4	63.5	149.2	8.7	6.4	19.1
5	141.2	193.5	215.9	9.7	76.2	22.4	141.2	193.5	215.9	25.4	69.9	171.5	8.7	6.4	22.4
6	168.1	218.9	241.3	12.7	76.2	22.4	168.1	218.9	241.3	25.4	82.6	193.7	8.7	6.4	22.4
8	218.9	276.4	298.5	12.7	76.2	22.4	218.9	273.1	298.5	28.4	95.3	247.7	8.7	6.4	22.4
10	273.1	336.6	362.0	15.7	101.6	25.4	273.1	330.2	362.0	31.8	101.6	304.8	8.7	6.4	25.4
12	323.9	406.4	431.8	19.1	101.6	25.4	323.9	406.4	431.8	35.1	120.7	381.0	8.7	6.4	25.4
14	355.6	447.5	476.3	19.1	108.0	28.4	355.6	425.5	476.3	35.1	127.0	396.9	8.7	6.4	28.4
16	406.4	511.0	539.8	22.4	108.0	28.4	406.4	482.6	539.8	38.1	127.0	454.0	8.7	6.4	28.4
18	457.2	546.1	577.9	25.4	114.3	31.8	457.2	546.1	577.9	41.1	127.0	517.5	8.7	6.4	31.8
20	508.0	603.3	635.0	28.4	120.7	31.8	508.0	596.9	635.0	41.1	127.0	558.8	8.7	6.4	31.8
24	609.6	714.2	749.3	31.8	139.7	35.1	609.6	711.2	749.3	47.8	152.4	673.1	8.7	6.4	35.1

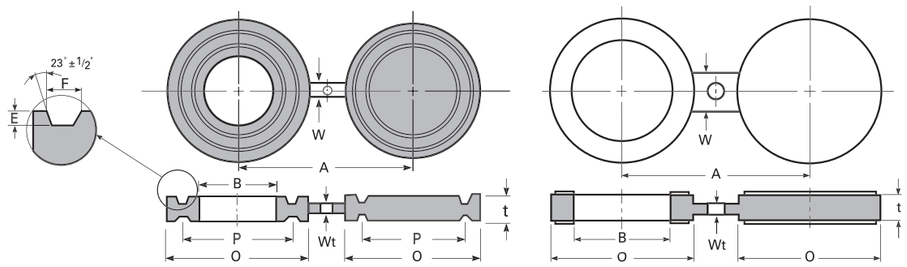
Class 300 FIGURE 8 BLANK RAISED FACE & FEMALE RING-JOINT FACING

Unit : mm

Nominal Pipe Size	SPECTACLE RAISED FACE						SPECTACLE RING JOINT FACING								
	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Hole Diam.	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Pitch Diam.	Width of Groove	Depth of Groove	Hole Diam.
	B	O	A	t	W		B	O	A	t	W	P	F	E	
1/2	15.7	50.8	66.5	6.4	38.1	15.7	21.3	50.8	57.4	15.7	38.1	34.1	7.1	5.6	15.7
3/4	20.8	63.5	82.6	6.4	38.1	19.1	26.7	63.5	82.6	19.1	44.5	42.9	8.7	6.4	19.1
1	26.7	69.9	88.9	6.4	38.1	19.1	33.5	69.9	88.9	19.1	50.8	50.8	8.7	6.4	19.1
1 1/4	42.2	79.2	98.6	6.4	38.1	19.1	42.2	79.2	98.6	22.4	50.8	60.3	8.7	6.4	19.1
1 1/2	48.3	91.9	114.3	6.4	50.8	22.4	48.3	90.4	114.3	22.4	57.2	68.3	8.7	6.4	22.4
2	60.5	108.0	127.0	9.7	50.8	19.1	60.5	108.0	127.0	25.4	57.2	82.6	11.9	7.9	19.1
2 1/2	73.2	127.0	149.4	9.7	63.5	22.4	73.2	127.0	149.4	28.4	57.2	101.6	11.9	7.9	22.4
3	88.9	146.1	168.1	9.7	63.5	22.4	88.9	146.1	168.1	28.4	57.2	123.8	11.9	7.9	22.4
3 1/2	101.6	162.1	184.2	12.7	63.5	22.4	101.6	158.8	184.2	28.4	63.5	131.8	11.9	7.9	22.4
4	114.3	177.8	200.2	12.7	63.5	22.4	114.3	174.8	200.2	31.8	63.5	149.2	11.9	7.9	22.4
5	141.2	212.9	235.0	15.7	76.2	22.4	141.2	209.6	235.0	35.1	69.9	181.0	11.9	7.9	22.4
6	168.1	247.7	269.7	15.7	76.2	22.4	168.1	241.3	269.7	35.1	82.6	211.2	11.9	7.9	22.4
8	218.9	304.8	330.2	22.4	88.9	25.4	218.9	301.8	330.2	41.1	95.3	269.9	11.9	7.9	25.4
10	273.1	358.6	387.4	25.4	101.6	28.4	273.1	355.6	387.4	44.5	101.6	323.9	11.9	7.9	28.4
12	323.9	419.1	450.9	28.4	101.6	31.8	323.9	412.8	450.9	50.8	120.7	381.0	11.9	7.9	31.8
14	355.6	482.6	514.4	31.8	120.7	31.8	355.6	457.2	514.4	53.8	127.0	419.1	11.9	7.9	31.8
16	406.4	536.4	571.5	38.1	124.0	35.1	406.4	508.0	571.5	57.2	127.0	469.9	11.9	7.9	35.1
18	457.2	593.9	628.7	41.1	114.3	35.1	457.2	574.5	628.7	60.5	127.0	533.4	11.9	7.9	35.1
20	508.0	650.7	685.8	44.5	120.7	35.1	508.0	635.0	685.8	69.9	127.0	584.2	13.5	9.5	35.1
24	609.6	771.7	812.8	50.8	139.7	41.1	609.6	749.3	812.8	79.2	152.4	692.2	16.7	11.1	41.1

Notes :
(1) Holes size(where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
(2) The thickness of the web(or tie bar) dimension Wt shall be 0.25 in. minimum, except when t is less than 0.25 in., Wt shall equal t

CLASS 600/900 FLANGES



Class 600 FIGURE 8 BLANK RAISED FACE & FEMALE RING-JOINT FACING

Unit : mm

Nominal Pipe Size	SPECTACLE RAISED FACE						SPECTACLE RING JOINT FACING								
	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Hole Diam.	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Pitch Diam.	Width of Groove	Depth of Groove	Hole Diam.
	B	O	A	t	W		B	O	A	t	W	P	F	E	
1/2	15.7	50.8	66.5	6.4	38.1	15.7	21.3	50.8	57.4	19.1	38.1	34.1	7.1	5.6	15.7
3/4	20.8	63.5	82.6	6.4	38.1	19.1	26.7	63.5	82.6	22.4	44.5	42.9	8.7	6.4	19.1
1	26.7	69.9	88.9	6.4	57.2	19.1	33.5	69.9	88.9	22.4	50.8	50.8	8.7	6.4	19.1
1 1/4	36.6	79.2	98.6	9.7	57.2	19.1	42.2	79.2	98.6	22.4	50.8	60.3	8.7	6.4	19.1
1 1/2	42.7	91.9	114.3	9.7	66.5	22.4	48.3	90.4	114.3	22.4	57.2	68.3	8.7	6.4	22.4
2	54.9	108.0	127.0	9.7	57.2	19.1	60.5	108.0	127.0	28.4	57.2	82.6	11.9	7.9	19.1
2 1/2	67.1	127.0	149.4	12.7	66.5	22.4	73.2	127.0	149.4	31.8	57.2	101.6	11.9	7.9	22.4
3	82.8	146.1	168.1	12.7	66.5	22.4	88.9	146.1	168.1	31.8	57.2	123.8	11.9	7.9	22.4
3 1/2	95.5	158.8	184.2	15.7	76.2	25.4	101.6	158.8	184.2	35.1	63.5	131.8	11.9	7.9	25.4
4	108.2	190.5	215.9	15.7	76.2	25.4	114.3	174.8	215.9	35.1	63.5	149.2	11.9	7.9	25.4
5	134.6	238.3	266.7	19.1	85.9	28.4	141.2	209.6	266.7	38.1	69.9	181.0	11.9	7.9	28.4
6	161.5	263.7	292.1	22.4	85.9	28.4	168.1	241.3	292.1	44.5	82.6	211.2	11.9	7.9	28.4
8	211.6	317.5	349.3	28.4	95.3	31.8	218.9	301.8	349.3	50.8	95.3	269.9	11.9	7.9	31.8
10	264.7	396.7	431.8	35.1	104.6	35.1	273.1	355.6	431.8	57.2	101.6	323.9	11.9	7.9	35.1
12	314.7	454.2	489.0	41.1	104.6	35.1	323.9	412.8	489.0	63.5	120.7	381.0	11.9	7.9	35.1
14	345.9	489.0	527.1	44.5	114.3	38.1	355.6	457.2	527.1	66.5	127.0	419.1	11.9	7.9	38.1
16	396.7	561.8	603.3	50.8	124.0	41.1	406.4	508.0	603.3	73.2	127.0	469.9	11.9	7.9	41.1
18	447.5	609.6	654.1	53.8	133.4	44.5	457.2	574.5	654.1	79.2	127.0	533.4	11.9	7.9	44.5
20	496.8	679.5	723.9	63.5	133.4	44.5	508.0	635.0	723.9	88.9	127.0	584.2	13.5	9.5	44.5
24	596.9	787.4	838.2	73.2	152.4	50.8	609.6	749.3	838.2	104.6	152.4	692.2	16.7	11.1	50.8

Class 900 FIGURE 8 BLANK RAISED FACE & FEMALE RING-JOINT FACING

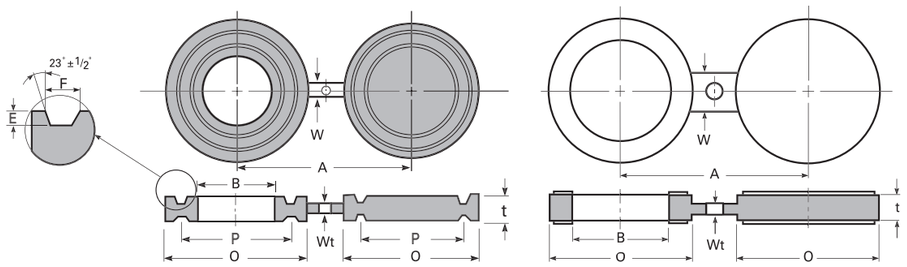
Unit : mm

Nominal Pipe Size	SPECTACLE RAISED FACE						SPECTACLE RING JOINT FACING								
	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Hole Diam.	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Pitch Diam.	Width of Groove	Depth of Groove	Hole Diam.
	B	O	A	t	W		B	O	A	t	W	P	F	E	
1/2	15.7	60.5	82.6	6.4	38.1	22.4	21.3	60.5	82.6	22.4	38.1	39.4	8.7	6.4	22.4
3/4	20.8	66.5	88.9	6.4	41.1	22.4	26.7	66.5	88.9	22.4	44.5	44.5	8.7	6.4	22.4
1	26.7	76.2	101.6	6.4	57.2	25.4	33.5	71.4	101.6	22.4	50.8	50.8	8.7	6.4	25.4
1 1/4	36.6	85.9	111.3	9.7	57.2	25.4	42.2	81.0	111.3	25.4	50.8	60.3	8.7	6.4	25.4
1 1/2	42.7	95.3	124.0	9.7	66.5	28.4	48.3	91.9	124.0	25.4	63.5	68.3	8.7	6.4	28.4
2	54.9	139.7	165.1	12.7	57.2	25.4	60.5	124.0	165.1	31.8	50.8	95.3	11.9	7.9	25.4
2 1/2	67.1	162.1	190.5	12.7	66.5	28.4	73.2	136.7	190.5	35.1	66.5	108.0	11.9	7.9	28.4
3	82.8	165.1	190.5	15.7	66.5	25.4	88.9	155.4	190.5	35.1	66.5	123.8	11.9	7.9	25.4
4	108.2	203.2	235.0	19.1	76.2	31.8	114.3	180.8	235.0	41.1	73.2	149.2	11.9	7.9	31.8
5	134.6	244.3	279.4	22.4	85.9	35.1	141.2	215.9	279.4	44.5	73.2	181.0	11.9	7.9	35.1
6	161.5	285.8	317.5	25.4	85.9	31.8	168.1	241.3	317.5	47.8	73.2	211.2	11.9	7.9	31.8
8	211.6	355.6	393.7	35.1	95.3	38.1	218.9	307.8	393.7	57.2	79.2	269.9	11.9	7.9	38.1
10	264.7	431.8	469.9	41.1	104.6	38.1	273.1	362.0	469.9	63.5	120.7	323.9	11.9	7.9	38.1
12	314.7	495.3	533.4	47.8	104.6	38.1	323.9	419.1	533.4	73.2	120.7	381.0	11.9	7.9	38.1
14	345.9	517.7	558.8	53.8	114.3	41.1	355.6	466.9	558.8	82.6	120.7	419.1	16.7	11.1	41.1
16	396.7	571.5	616.0	60.5	124.0	44.5	406.4	523.7	616.0	91.9	127.0	469.9	16.7	11.1	44.5
18	447.5	635.0	685.8	66.5	133.4	50.8	457.2	593.9	685.8	101.6	133.4	533.4	19.8	12.7	50.8
20	496.8	695.5	749.3	73.2	133.4	53.8	508.0	647.7	749.3	111.3	127.0	584.2	19.8	12.7	53.8
24	596.9	835.2	901.7	88.9	152.4	66.5	609.6	771.7	901.7	133.4	139.7	692.2	27.0	15.9	66.5

Notes :

(1) Holes size(where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
(2) The thickness of the web(or tie bar) dimension Wt shall be 0.25 in. minimum, except when t is less than 0.25 in., Wt shall equal t

CLASS 1500/2500 FLANGES



Class 1500 FIGURE 8 BLANK RAISED FACE & FEMALE RING-JOINT FACING

Unit : mm

Nominal Pipe Size	SPECTACLE RAISED FACE						SPECTACLE RING JOINT FACING								
	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Hole Diam.	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Pitch Diam.	Width of Groove	Depth of Groove	Hole Diam.
	B	O	A	t	W		B	O	A	t	W	P	F	E	
1/2	15.7	60.5	82.6	6.4	38.1	22.4	21.3	60.5	82.6	22.4	38.1	39.4	8.7	6.4	22.4
3/4	20.8	66.5	88.9	9.7	41.1	22.4	26.7	66.5	88.9	25.4	44.5	44.5	8.7	6.4	22.4
1	26.7	76.2	101.6	9.7	63.5	25.4	33.5	71.4	101.6	25.4	53.8	50.8	8.7	6.4	25.4
1 1/4	35.1	85.9	111.3	9.7	63.5	25.4	42.2	81.0	111.3	25.4	53.8	60.3	8.7	6.4	25.4
1 1/2	40.9	95.3	124.0	12.7	69.9	28.4	48.3	91.9	124.0	28.4	57.2	68.3	8.7	6.4	28.4
2	52.6	139.7	165.1	12.7	69.9	25.4	60.5	124.0	165.1	35.1	53.8	95.3	11.9	7.9	25.4
2 1/2	62.7	162.1	190.5	15.7	76.2	28.4	73.2	136.7	190.5	38.1	57.2	108.0	11.9	7.9	28.4
3	78.0	171.5	203.2	19.1	76.2	31.8	88.9	168.1	203.2	44.5	73.2	136.5	11.9	7.9	31.8
4	102.4	206.2	241.3	22.4	88.9	35.1	114.3	193.5	241.3	47.8	76.2	161.9	11.9	7.9	35.1
5	128.3	251.0	292.1	28.4	88.9	41.1	141.2	228.6	292.1	53.8	76.2	193.7	11.9	7.9	41.1
6	153.9	279.4	317.5	35.1	88.9	38.1	168.1	247.7	393.7	60.5	79.2	211.2	13.5	9.5	38.1
8	202.7	349.3	393.7	41.1	101.6	44.5	218.9	317.5	482.6	73.2	85.9	269.9	16.7	11.1	44.5
10	254.5	431.8	482.6	50.8	114.3	50.8	273.1	371.3	571.5	82.6	133.4	323.9	16.7	11.1	50.8
12	303.3	517.7	571.5	60.5	114.3	53.8	323.9	438.2	635.0	101.6	133.4	381.0	23.0	14.3	53.8
14	333.2	574.5	635.0	66.5	127.0	60.5	355.6	489.0	704.9	111.3	139.7	419.1	27.0	15.9	60.5
16	381.0	638.0	704.9	76.2	133.4	66.5	406.4	546.1	774.7	124.0	146.1	469.9	30.2	17.5	66.5
18	428.8	701.5	774.7	85.9	146.1	73.2	457.2	612.6	831.9	133.4	152.4	533.4	30.2	17.5	73.2
20	477.8	752.3	831.9	95.3	152.4	79.2	508.0	673.1	749.3	142.7	165.1	584.2	33.4	17.5	79.2
24	574.5	898.7	990.6	111.3	177.8	91.9	609.6	793.8	990.6	168.1	177.8	692.2	36.5	20.6	91.9

Class 2500 FIGURE 8 BLANK RAISED FACE & FEMALE RING-JOINT FACING

Unit : mm

Nominal Pipe Size	SPECTACLE RAISED FACE						SPECTACLE RING JOINT FACING								
	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Hole Diam.	Inside Diam.	Outside Diam.	Center -line Diam.	Thick -ness	Web Width	Pitch Diam.	Width of Groove	Depth of Groove	Hole Diam.
	B	O	A	t	W		B	O	A	t	W	P	F	E	
1/2	15.7	66.5	88.9	9.7	38.1	22.4	21.3	65.0	88.9	25.4	38.1	42.9	8.7	6.4	22.4
3/4	20.8	73.2	95.3	9.7	41.1	22.4	26.7	73.2	95.3	28.4	44.5	50.8	8.7	6.4	22.4
1	26.7	82.6	108.0	9.7	63.5	25.4	33.5	82.6	108.0	28.4	53.8	60.3	8.7	6.4	25.4
1 1/4	35.1	101.6	130.0	12.7	63.5	28.4	42.2	101.6	130.0	35.1	53.8	72.2	11.9	7.9	28.4
1 1/2	40.9	114.3	146.1	15.7	69.9	31.8	48.3	114.3	146.1	38.1	60.5	82.6	11.9	7.9	31.8
2	52.6	142.7	171.5	15.7	69.9	28.4	60.5	133.4	171.5	41.1	57.2	101.6	11.9	7.9	28.4
2 1/2	62.7	165.1	196.9	19.1	76.2	31.8	73.2	149.4	196.9	47.8	60.5	111.1	13.5	9.5	31.8
3	78.0	193.5	228.6	22.4	76.2	35.1	88.9	168.1	228.6	50.8	76.2	127.0	13.5	9.5	35.1
4	102.4	231.6	273.1	28.4	88.9	41.1	114.3	203.2	273.1	63.5	82.6	157.2	16.7	11.1	41.1
5	128.3	276.4	323.9	35.1	88.9	47.8	141.2	241.3	323.9	73.2	88.9	190.5	19.8	12.7	47.8
6	153.9	314.5	368.3	41.1	88.9	53.8	168.1	279.4	368.3	82.6	95.3	228.6	19.8	12.7	53.8
8	198.4	384.0	438.2	53.8	101.6	53.8	218.9	339.9	438.2	98.6	95.3	279.4	23.0	14.3	53.8
10	247.7	472.9	539.8	66.5	114.3	66.5	273.1	425.5	539.8	117.3	90.9	342.9	30.2	17.5	66.5
12	288.8	546.1	619.3	79.2	114.3	73.2	323.9	495.3	619.3	133.4	152.4	406.4	33.4	17.5	73.2

Notes :

(1) Holes size(where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
(2) The thickness of the web(or tie bar) dimension Wt shall be 0.25 in. minimum, except when t is less than 0.25 in., Wt shall equal t.

Flange and Fittings


SLIP-ON


LAP-JOINT

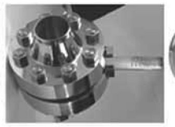

WELDING NECK


THREADED


SOCKET WELDING


BLIND

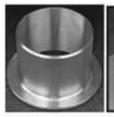

RING TYPE JOINT

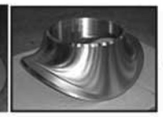

ORIFICE


RTJ GASKET


SPECTACLE BLIND


SPACER RING & PADDLE BLANK

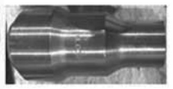

STUB END


SWEEPOLET


WELDOLET


SOCKOLET


THREADOLET


NIPPOLET


NIPPO FLANGE


CAP

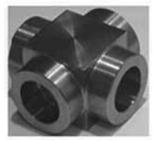

NOZZLE


NIPPLE


FULL COUPLING


HALF COUPLING


BOSS


CROSS

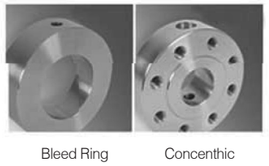

ELBOW


HEX PLUG


UNION


TEE


Socket Elbow


Bleed Ring
Concenthic
FLUSH RINGS


Thread Elbow


Concentric REDUCER


ORIFICE FLANGE ASSEMBLY


LONG WELDING

JIS B2220 / KS B1503





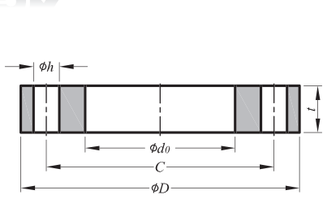




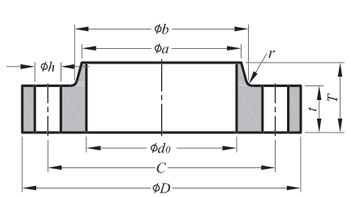




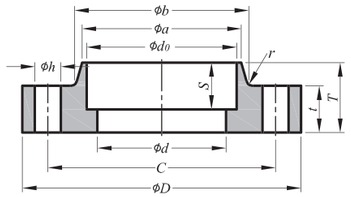
5K



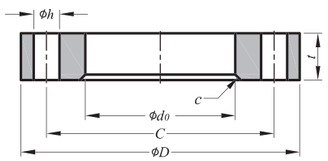
SOP of nominal size
10A to 1500A



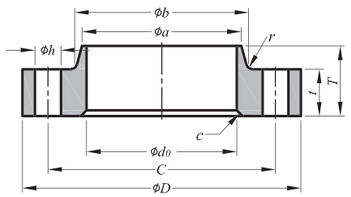
SOH of nominal size
450A to 1500A



SW of nominal size
10A to 80A



LJ of nominal size
15A to 400A



LJ of nominal size
450A to 600A

JIS B 2220-2004 (KS B 1503-2007)

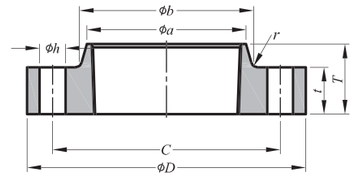
Unit : mm

Nominal Size	Outside Diam. of Applicable Pipe	Outside Diam. of Flange	Inside Diam. of Flange				Thickness of Flange		Total Length of Flange		Diameter of hub			
											Small Diameter		Large Diameter	
			SO,SW	LJ	SW,WN	IT	Except for BL	BL	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN
A		D	d0	d0	d[2]	d	t	t	T	T	a	a	h	h[2]
10	17.3	75	17.8	-	12.7	10	9	9	13	24	23	17.3	26	26
15	21.7	80	22.2	23.4	16.1	15	9	9	13	25	27	21.7	30	31
20	27.2	85	27.7	28.9	21.6	20	10	10	15	28	33	27.2	36	38
25	34.0	95	34.5	35.6	27.6	25	10	10	17	30	41	34.0	44	46
32	42.7	115	43.2	44.3	35.7	32	12	12	19	33	50	42.7	53	55
40	48.6	120	49.1	50.4	41.6	40	12	12	20	34	56	48.6	60	62
50	60.5	130	61.1	62.7	52.9	50	14	14	24	36	69	60.5	73	73
65	76.3	155	77.1	78.7	67.9	65	14	14	27	39	86	76.3	91	91
80	89.1	180	90.0	91.6	80.7	80	14	14	30	41	99	89.1	105	105
90	101.6	190	102.6	104.1	93.2	90	14	14	-	41	-	101.6	-	117
100	114.3	200	115.4	116.9	105.3	100	16	16	36	41	127	114.3	130	128
125	139.8	235	141.2	143.0	130.8	125	16	16	40	43	154	139.8	161	156
150	165.2	265	166.6	168.4	155.2	150	18	18	40	49	182	165.2	189	184
175	190.7	300	192.1	-	180.1	175	18	18	-	49	-	190.7	-	209
200	216.3	320	218.0	219.5	204.7	200	20	20	-	53	-	216.3	-	235
225	241.8	345	243.7	-	229.4	225	20	20	-	54	-	241.8	-	261
250	267.4	385	269.5	271.7	254.2	250	22	22	-	61	-	267.4	-	290
300	318.5	430	321.0	322.8	304.7	300	22	22	-	62	-	318.5	-	342
350	355.6	480	358.1	360.2	339.8	340	24	24	-	73	-	355.6	-	385
400	406.4	540	409.0	411.2	390.6	400	24	24	-	76	-	406.4	-	438
450	457.2	605	460.0	462.3	441.4	450	24	24	40	79	495	457.2	500	491
500	508.0	655	511.0	514.4	492.2	500	24	24	40	79	546	508.0	552	541
550	558.8	720	562.0	565.2	543.0	550	26	26	42	81	597	558.8	603	593
600	609.6	770	613.0	616.0	593.8	600	26	26	44	81	648	609.6	654	643
650	660.4	825	664.0	-	644.6	650	26	28	48	85	702	660.4	708	698
700	711.2	875	715.0	-	695.4	700	26	30	48	94	751	711.2	758	748
750	762.0	945	766.0	-	746.2	750	28	32	52	100	802	762.0	810	802
800	812.8	995	817.0	-	797.0	800	28	34	52	100	854	812.8	862	852
850	863.6	1045	868.0	-	847.8	850	28	36	54	108	904	863.6	912	902
900	914.4	1095	919.0	-	898.6	900	30	36	56	108	956	914.4	964	952
1000	1016.0	1195	1021.0	-	1000.2	1000	32	40	60	116	1058	1016.0	1066	1052
1100	1117.6	1305	1122.0	-	1098.6	1100	32	44	71	136	1158	1117.6	1170	1162
1200	1219.2	1420	1224.0	-	1200.2	1200	34	48	77	155	1260	1219.2	1272	1272
1350	1371.6	1575	1376.0	-	1346.2	1350	34	54	80	164	1414	1371.6	1426	1427
1500	1524.0	1730	1529.0	-	1498.6	1500	36	58	86	172	1568	1524.0	1580	1582

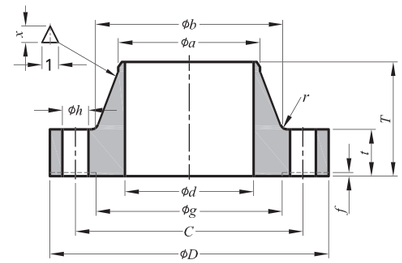
Notes :

(1) The facing of flanges shall conform to JIS B2202-2004

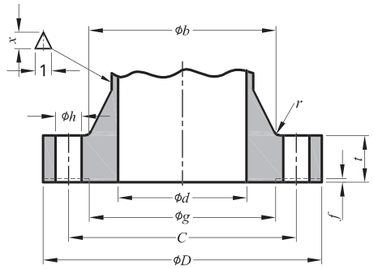
(2) Adjustment shall be made according to the inside diameter of the steel pipes to be joined with.



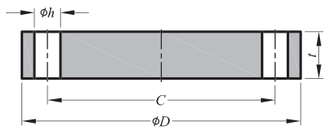
TR of nominal size 10A to 150A



WN of nominal size 10A to 1500A



IT of nominal size 10A to 1500A



BL of nominal size 10A to 1500A

Unit : mm

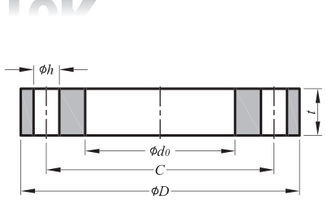
Nominal Size	Depth of Socket	Norminal design-ation of thread	Cham fering[4]	Radius of Fillet		Raised face		Diameter of Bolt			Norm -inal Bolt Size	Taper of hub		Substitutional dimension of WN[5]	
						Height	Diameter								
	SW		LJ	SO, LJ, TR	WN, IT	WN, IT		Diam. of Bolt Circle	Num. of Bolt Holes	Diam. of Bolt Circle		WN	IT (Min)	Thick-ness	Taper of hub
A	S		c	r	r[1]	f	g	C		h		x	x	t	x
10	10	Rc 3/8	-	4	4	1	39	55	4	12	M10	1.25	1.25	-	-
15	10	Rc 1/2	3	4	4	1	44	60	4	12	M10	1.25	1.25	-	-
20	13	Rc 3/4	3	4	4	1	49	65	4	12	M10	1.25	1.25	-	-
25	13	Rc 1	3	4	4	1	59	75	4	12	M10	1.25	1.25	-	-
32	13	Rc 1 1/4	4	4	4	2	70	90	4	15	M12	1.25	1.25	-	-
40	13	Rc 1 1/2	4	4	4	2	75	95	4	15	M12	1.25	1.25	-	-
50	16	Rc 2	4	4	4	2	85	105	4	15	M12	1.25	1.25	-	-
65	16	Rc 2 1/2	5	4	4	2	110	130	4	15	M12	1.25	1.25	-	-
80	16	Rc 3	5	4	4	2	121	145	4	19	M16	1.25	1.25	-	-
90	-	-	5	-	4	2	131	155	4	19	M16	1.25	1.25	-	-
100	-	Rc 4	5	4	4	2	141	165	8	19	M16	1.25	1.25	-	-
125	-	Rc 5	6	4	4	2	176	200	8	19	M16	1.25	1.25	-	-
150	-	Rc 6	6	4	4	2	206	230	8	19	M16	1.25	1.25	-	-
175	-	-	-	-	4	2	232	260	8	23	M20	1.25	1.25	-	-
200	-	-	6	-	4	2	252	280	8	23	M20	1.25	1.25	-	-
225	-	-	-	-	4	2	277	305	12	23	M20	1.25	1.25	-	-
250	-	-	6	-	4	2	317	345	12	23	M20	1.25	1.25	-	-
300	-	-	9	-	4	3	360	390	12	23	M20	1.25	1.25	-	-
350	-	-	9	-	4	3	403	435	12	25	M22	1.25	1.25	-	-
400	-	-	9	-	4	3	463	495	16	25	M22	1.25	1.25	-	-
450	-	-	9	5	5	3	523	555	16	25	M22	1.25	1.25	-	-
500	-	-	9	5	5	3	573	605	20	25	M22	1.25	1.25	-	-
550	-	-	9	5	5	3	630	665	20	27	M24	1.25	1.25	-	-
600	-	-	9	5	5	3	680	715	20	27	M24	1.25	1.25	-	-
650	-	-	-	5	5	3	735	770	24	27	M24	1.25	1.25	-	-
700	-	-	-	5	5	3	785	820	24	27	M24	1.5	1.5	36	1.25
750	-	-	-	5	5	3	840	880	24	33	M30	1.5	1.5	38	1.25
800	-	-	-	5	5	3	890	930	24	33	M30	1.5	1.5	38	1.25
850	-	-	-	5	5	3	940	980	24	33	M30	1.75	1.75	38	1.50
900	-	-	-	5	5	3	990	1030	24	33	M30	1.75	1.75	40	1.50
1000	-	-	-	5	5	3	1090	1130	28	33	M30	2	2	50	1.50
1100	-	-	-	7	8	3	1200	1240	28	33	M30	2	2	56	1.50
1200	-	-	-	7	8	3	1305	1350	32	33	M30	2	2	62	1.50
1350	-	-	-	7	8	3	1460	1505	32	33	M30	2	2	62	1.50
1500	-	-	-	7	10	3	1615	1660	36	33	M30	2	2	66	1.50

(3) With IT flanges, this dimension is shown for reference.

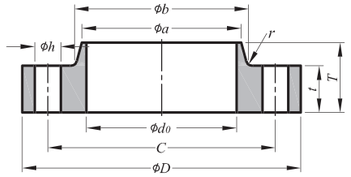
(4) This may be rounded off with the dimension c as a radius.

(5) This dimension may be determined on the agreement between the parties concerned.

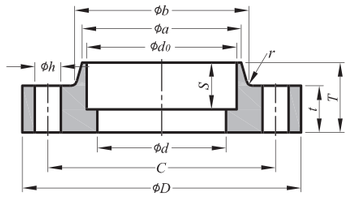
10K



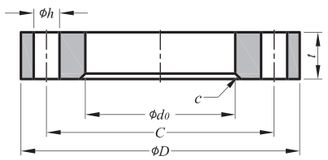
SOP of nominal size
10A to 1500A



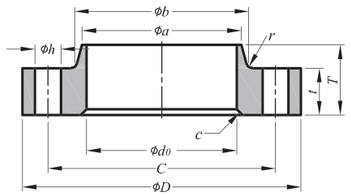
SOH of nominal size
250A to 1500A



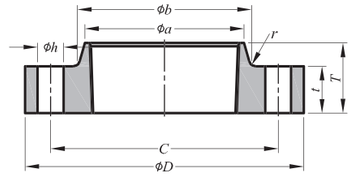
SW of nominal size
10A to 80A



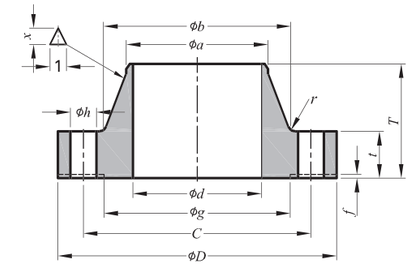
LJ of nominal size
15A to 200A



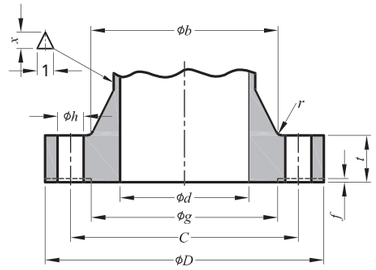
LJ of nominal size
250A to 600A



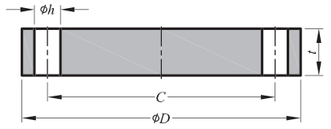
TR of nominal size 10A to 150A



WN of nominal size 10A to 1500A



IT of nominal size 10A to 1500A



BL of nominal size 10A to 1500A

JIS B 2220-2004 (KS B 1503-2007)

Unit : mm

Nominal Size	Outside Diam. of Applicable Pipe	Outside Diam. of Flange	Inside Diam. of Flange				Thickness of Flange		Total Length of Flange		Diameter of hub			
											Small Diameter		Large Diameter	
			SO,SW	LJ	SW,WN	IT	Except for BL	BL	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN
A		D	d0	d0	d[2]	d	t	t	T	T	a	a	h	h[3]
10	17.3	90	17.8	-	12.7	10	12	12	16	29	23	17.3	26	28
15	21.7	95	22.2	23.4	16.1	15	12	12	16	31	27	21.7	30	33
20	27.2	100	27.7	28.9	21.6	20	14	14	20	32	33	27.2	36	38
25	34.0	125	34.5	35.6	27.6	25	14	14	20	36	41	34.0	44	47
32	42.7	135	43.2	44.3	35.7	32	16	16	22	38	50	42.7	53	56
40	48.6	140	49.1	50.4	41.6	40	16	16	24	38	56	48.6	60	62
50	60.5	155	61.1	62.7	52.9	50	16	16	24	40	69	60.5	73	75
65	76.3	175	77.1	78.7	67.9	65	18	18	27	44	86	76.3	91	92
80	89.1	185	90.0	91.6	80.7	80	18	18	30	45	99	89.1	105	105
90	101.6	195	102.6	104.1	93.2	90	18	18	-	45	-	101.6	-	117
100	114.3	210	115.4	116.9	105.3	100	18	18	36	45	127	114.3	130	130
125	139.8	250	141.2	143.0	130.8	125	20	20	40	47	154	139.8	161	156
150	165.2	280	166.6	168.4	155.2	150	22	22	40	53	182	165.2	189	184
175	190.7	305	192.1	-	180.1	175	22	22	-	55	-	190.7	-	210
200	216.3	330	218.0	219.5	204.7	200	22	22	-	58	-	216.3	-	238
225	241.8	350	243.7	-	229.4	225	22	22	-	58	-	241.8	-	261
250	267.4	400	269.5	271.7	254.2	250	24	24	36	65	288	267.4	292	292
300	318.5	445	321.0	322.8	304.7	300	24	24	38	68	340	318.5	346	345
350	355.6	490	358.1	360.2	339.8	340	26	26	42	79	380	355.6	386	388
400	406.4	560	409.0	411.2	390.6	400	28	28	44	85	436	406.4	442	442
450	457.2	620	460.0	462.3	441.4	450	30	30	48	90	496	457.2	502	495
500	508.0	675	511.0	514.4	492.2	500	30	30	48	99	548	508.0	554	546
550	558.8	745	562.0	565.2	543.0	550	32	34	52	111	604	558.8	610	597
600	609.6	795	613.0	616.0	593.8	600	32	36	52	112	656	609.6	662	648
650	660.4	845	664.0	-	644.6	650	34	38	56	116	706	660.4	712	700
700	711.2	905	715.0	-	695.4	700	34	40	58	132	762	711.2	770	754
750	762.0	970	766.0	-	746.2	750	36	44	62	139	816	762.0	824	807
800	812.8	1020	817.0	-	797.0	800	36	46	64	139	868	812.8	876	858
850	863.6	1070	868.0	-	847.8	850	36	48	66	139	920	863.6	928	908
900	914.4	1120	919.0	-	898.6	900	38	50	70	140	971	914.4	979	959
1000	1016.0	1235	1021.0	-	1000.2	1000	40	56	74	151	1073	1016.0	1081	1065
1100	1117.6	1345	1122.0	-	1098.6	1100	42	62	95	170	1175	1117.6	1185	1174
1200	1219.2	1465	1224.0	-	1200.2	1200	44	66	101	182	1278	1219.2	1290	1281
1350	1371.6	1630	1376.0	-	1346.2	1350	48	74	110	200	1432	1371.6	1450	1438
1500	1524.0	1795	1529.0	-	1498.6	1500	50	82	123	218	1585	1524.0	1605	1598

Unit : mm

Nominal Size	Depth of Socket	Norminal design-ation of thread	Cham fering[4]	Radius of Fillet		Raised face		Diameter of Bolt			Norm -inal Bolt Size	Taper of hub		Substitutional dimension of WN[5]	
						Height	Diameter								
	SW		LJ	SO, LJ, TR	WN, IT	WN, IT		Diam. of Bolt Circle	Num. of Bolt Holes	Diam. of Bolt Circle		WN	IT (Min)	Thick-ness	Taper of hub
A	S		c	r	r[1]	f	g	C		h		x	x	t	x
10	10	Rc 3/8	-	4	4	1	46	65	4	15	M12	1.25	1.25	-	-
15	10	Rc 1/2	3	4	4	1	51	70	4	15	M12	1.25	1.25	-	-
20	13	Rc 3/4	3	4	4	1	56	75	4	15	M12	1.25	1.25	-	-
25	13	Rc 1	3	4	4	1	67	90	4	19	M16	1.25	1.25	-	-
32	13	Rc 1 1/4	4	4	4	2	76	100	4	19	M16	1.25	1.25	-	-
40	13	Rc 1 1/2	4	4	4	2	81	105	4	19	M16	1.25	1.25	-	-
50	16	Rc 2	4	4	4	2	95	120	4	19	M16	1.25	1.25	-	-
65	16	Rc 2 1/2	5	4	4	2	116	140	4	19	M16	1.25	1.25	-	-
80	16	Rc 3	5	4	5	2	126	150	8	19	M16	1.25	1.25	-	-
90	-	-	5	-	5	2	136	160	8	19	M16	1.25	1.25	-	-
100	-	Rc 4	5	4	5	2	151	175	8	19	M16	1.25	1.25	-	-
125	-	Rc 5	6	4	5	2	182	210	8	23	M20	1.25	1.25	-	-
150	-	Rc 6	6	4	5	2	212	240	8	23	M20	1.25	1.25	-	-
175	-	-	-	-	5	2	237	265	12	23	M20	1.25	1.25	-	-
200	-	-	6	-	5	2	262	290	12	23	M20	1.25	1.25	-	-
225	-	-	-	-	5	2	282	310	12	23	M20	1.25	1.25	-	-
250	-	-	6	6	6	2	324	355	12	25	M22	1.25	1.25	-	-
300	-	-	9	6	6	3	368	400	16	25	M22	1.25	1.25	-	-
350	-	-	9	6	6	3	413	445	16	25	M22	1.25	1.25	-	-
400	-	-	9	6	6	3	475	510	16	27	M24	1.25	1.25	-	-
450	-	-	9	6	6	3	530	565	20	27	M24	1.25	1.25	-	-
500	-	-	9	6	6	3	585	620	20	27	M24	1.5	1.5	40	1.25
550	-	-	9	6	6	3	640	680	20	33	M30	1.75	1.75	42	1.5
600	-	-	9	6	6	3	690	730	24	33	M30	1.75	1.75	42	1.5
650	-	-	-	6	6	3	740	780	24	33	M30	1.75	1.75	44	1.5
700	-	-	-	6	6	3	800	840	24	33	M30	2	2	56	1.5
750	-	-	-	6	6	3	855	900	24	33	M30	2	2	60	1.5
800	-	-	-	6	6	3	905	950	28	33	M30	2	2	60	1.5
850	-	-	-	6	6	3	955	1000	28	33	M30	2	2	60	1.5
900	-	-	-	6	6	3	1005	1050	28	33	M30	2	2	62	1.5
1000	-	-	-	6	6	3	1110	1160	28	39	M36	2	2	66	1.5
1100	-	-	-	8	10	3	1220	1270	28	39	M36	2	2	72	1.5
1200	-	-	-	8	10	3	1325	1380	32	39	M36	2	2	76	1.5
1350	-	-	-	8	10	3	1480	1540	36	45	M42	2	2	82	1.5
1500	-	-	-	8	12	3	1635	1700	40	45	M42	2	2	88	1.5

Notes :

(1) The facing of flanges shall conform to JIS B2202-2004

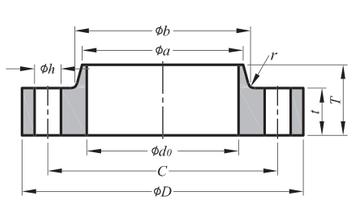
(2) Adjustment shall be made according to the inside diameter of the steel pipes to be joined with.

(3) With IT flanges, this dimension is shown for reference.

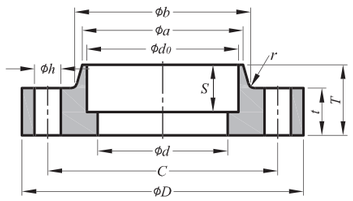
(4) This may be rounded off with the dimension c as a radius.

(5) This dimension may be determined on the agreement between the parties concerned.

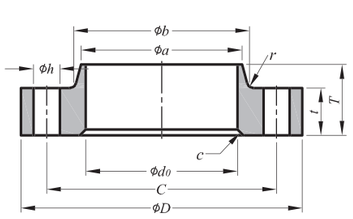
16K



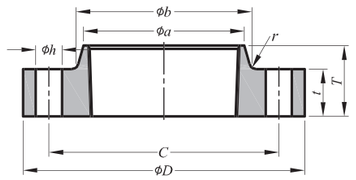
SOH of nominal size
10A to 600A



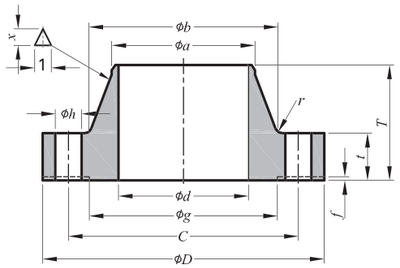
SW of nominal size
10A to 80A



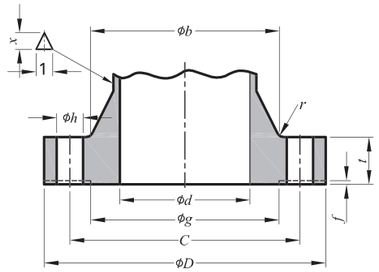
LJ of nominal size
15A to 600A



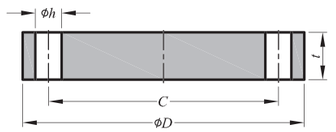
TR of nominal size 10A to 150A



WN of nominal size 10A to 600A



IT of nominal size 10A to 600A



BL of nominal size 10A to 600A

JIS B 2220-2004 (KS B 1503-2007)

Unit : mm

Nominal Size	Outside Diam. of Applicable Pipe	Outside Diam. of Flange	Inside Diam. of Flange			Thickness of Flange	Total Length of Flange				Diameter of hub			
			SO,SW	LJ	SW,WN	IT	SO,LJ,TR, WN,IT,BL	SO, SW, LJ, TR	TR	WN	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN
											Small Diameter		Large Diameter	
A		D	d0	d0	d[2]	d	t	T	T	T	a	a	b	b[3]
10	17.3	90	17.8	-	12.7	10	12	16	16	31	26	17.3	28	29
15	21.7	95	22.2	23.4	16.1	15	12	16	16	32	30	21.7	32	34
20	27.2	100	27.7	28.9	21.4	20	14	20	20	34	38	27.2	42	39
25	34.0	125	34.5	35.6	27.2	25	14	20	20	36	46	34	50	47
32	42.7	135	43.2	44.3	35.5	32	16	22	22	39	56	42.7	60	56
40	48.6	140	49.1	50.4	41.2	40	16	24	24	39	62	48.6	66	62
50	60.5	155	61.1	62.7	52.7	50	16	24	24	40	76	60.5	80	75
65	76.3	175	77.1	78.7	65.9	65	18	26	27	46	94	76.3	98	92
80	89.1	200	90.0	91.6	78.1	80	20	28	30	49	108	89.1	112	105
90	101.6	210	102.6	104.1	90.2	90	20	30	-	50	120	101.6	124	118
100	114.3	225	115.4	116.9	102.3	100	22	34	36	56	134	114.3	138	134
125	139.8	270	141.2	143.0	126.6	125	22	34	40	60	164	139.8	170	162
150	165.2	305	166.6	168.4	151.0	150	24	38	40	69	196	165.2	202	192
200	216.3	350	218.0	219.5	199.9	200	26	40	-	73	244	216.3	252	244
250	267.4	430	269.5	271.7	248.8	250	28	44	-	81	304	267.4	312	298
300	318.5	480	321.0	322.8	297.9	300	30	48	-	88	354	318.5	364	352
350	355.6	540	358.1	360.2	333.4	335	34	52	-	104	398	355.6	408	398
400	406.4	605	409.0	411.2	381.0	380	38	60	-	115	446	406.4	456	452
450	457.2	675	460.0	462.3	431.8	430	40	64	-	126	504	457.2	514	510
500	508.0	730	511.0	514.4	482.6	480	42	68	-	128	558	508	568	561
550	558.8	795	562.0	565.2	533.4	530	44	70	-	135	612	558.8	622	616
600	609.6	845	613.0	616.0	584.2	580	46	74	-	141	666	609.6	676	670

Notes :

(1) The facing of flanges shall conform to JIS B2202-2004

(2) Adjustment shall be made according to the inside diameter of the steel pipes to be joined with.

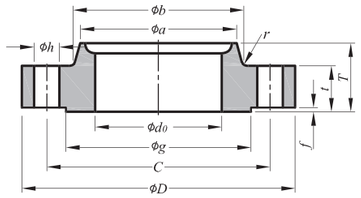
Unit : mm

Nominal Size	Depth of Socket	Norminal designation of thread	Chamfering[4]	Radius of Fillet	Raised face		Diameter of Bolt			Nominal Bolt Size	Taper of hub	
	SW		LJ	SO, LJ, TR, WN, IT	WN, IT		of Bolt Circle	of Bolt Holes	of Bolt Hole		WN	IT (Min)
					Height	Diameter						
A	S		c	r	f	g	C		h		x	x
10	10	Rc 3/8	-	4	1	46	65	4	15	M12	1.25	1.25
15	10	Rc 1/2	3	4	1	51	70	4	15	M12	1.25	1.25
20	13	Rc 3/4	3	4	1	56	75	4	15	M12	1.25	1.25
25	13	Rc 1	3	4	1	67	90	4	19	M16	1.25	1.25
32	13	Rc 1 1/4	4	5	2	76	100	4	19	M16	1.25	1.25
40	13	Rc 1 1/2	4	5	2	81	105	4	19	M16	1.25	1.25
50	16	Rc 2	4	5	2	96	120	8	19	M16	1.25	1.25
65	16	Rc 2 1/2	5	5	2	116	140	8	19	M16	1.25	1.25
80	16	Rc 3	5	6	2	132	160	8	23	M20	1.25	1.25
90	-	-	5	6	2	145	170	8	23	M20	1.25	1.25
100	-	Rc 4	5	6	2	160	185	8	23	M20	1.25	1.25
125	-	Rc 5	6	6	2	195	225	8	25	M22	1.25	1.25
150	-	Rc 6	6	6	2	230	260	12	25	M22	1.25	1.25
200	-	-	6	6	2	275	305	12	25	M22	1.25	1.25
250	-	-	6	6	2	345	380	12	27	M24	1.25	1.25
300	-	-	9	8	3	395	430	16	27	M24	1.25	1.25
350	-	-	9	8	3	440	480	16	33	M30×3	1.25	1.25
400	-	-	9	10	3	495	540	16	33	M30×3	1.25	1.25
450	-	-	9	10	3	560	605	20	33	M30×3	1.25	1.25
500	-	-	9	10	3	615	660	20	33	M30×3	1.25	1.25
550	-	-	9	10	3	670	720	20	39	M36×3	1.25	1.25
600	-	-	9	10	3	720	770	24	39	M36×3	1.25	1.25

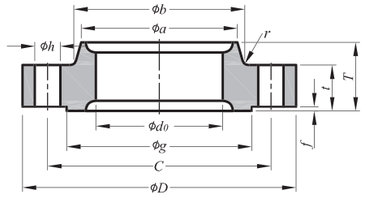
(3) With IT flanges, this dimension is shown for reference.

(4) This may be rounded off with the dimension c as a radius.

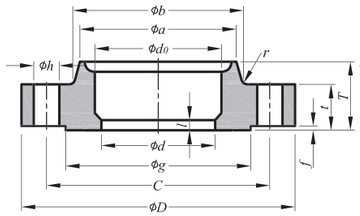
20K



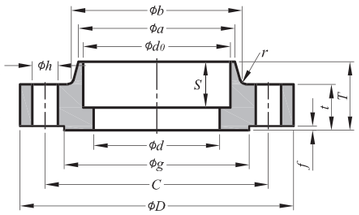
SOH type A of nominal size
10A to 600A



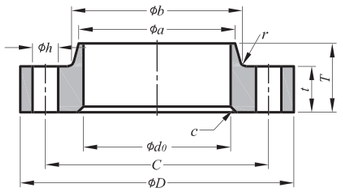
SOH type B of nominal size
10A to 50A



SOH type C of nominal size
65A to 600A



SW of nominal size
10A to 80A



LJ of nominal size
15A to 600A

JIS B 2220-2004 (KS B 1503-2007)

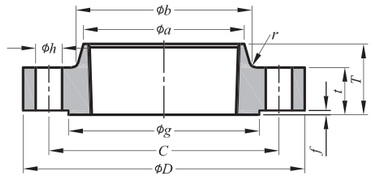
Unit : mm

Nominal Size	Outside Diam. of Applicable Pipe	Outside Diam. of Flange	Inside Diam. of Flange			Thickness of Flange		Total Length of Flange		Diameter of hub			
			SO,SW	LJ	SW,WN	IT	Except for BL	BL	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN
											Small Diameter		Large Diameter	
A		D	d0	d0	d[2]	d	t	t	T	T	a	a	b	b[3]
10	17.3	90	17.8	-	12.7	10	14	14	20	33	30	17.3	32	29
15	21.7	95	22.2	23.4	16.1	15	14	14	20	34	34	21.7	36	34
20	27.2	100	27.7	28.9	21.4	20	16	16	22	36	40	27.2	42	39
25	34.0	125	34.5	35.6	27.2	25	16	16	24	38	48	34	50	47
32	42.7	135	43.2	44.3	35.5	32	18	18	26	41	56	42.7	60	56
40	48.6	140	49.1	50.4	41.2	40	18	18	26	41	62	48.6	66	62
50	60.5	155	61.1	62.7	52.7	50	18	18	26	42	76	60.5	80	75
65	76.3	175	77.1	78.7	65.9	20	20	20	30	48	100	76.3	104	92
80	89.1	200	90.0	91.6	65.9	80	22	22	34	51	113	89.1	117	105
90	101.6	210	102.6	104.1	90.2	90	24	24	36	54	126	101.6	130	118
100	114.3	225	115.4	116.9	102.3	100	24	24	36	58	138	114.3	142	134
125	139.8	270	141.2	143.0	126.6	125	26	26	40	64	166	139.8	172	162
150	165.2	305	166.6	168.4	151.0	150	28	28	42	73	196	165.2	202	192
200	216.3	350	218.0	219.5	199.9	200	30	30	46	77	244	216.3	252	244
250	267.4	430	269.5	271.7	248.8	250	34	34	52	87	304	267.4	312	298
300	318.5	480	321.0	322.8	297.9	300	36	36	56	94	354	318.5	364	352
350	355.6	540	358.1	360.2	333.4	335	40	40	62	110	398	355.6	408	398
400	406.4	605	409.0	411.2	381.0	380	46	46	70	123	446	406.4	456	452
450	457.2	675	460.0	462.3	431.8	430	48	48	78	134	504	457.2	514	510
500	508.0	730	511.0	514.4	482.6	480	50	50	84	136	558	508	568	561
550	558.8	795	562.0	565.2	533.4	530	52	52	90	143	612	558.8	622	616
600	609.6	845	613.0	616.0	584.2	580	54	56	96	149	666	609.6	676	670

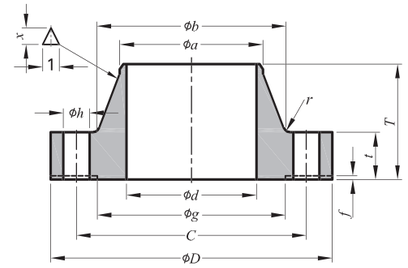
Notes :

(1) The facing of flanges shall conform to JIS B2202-2004

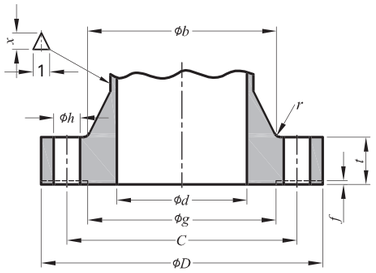
(2) Adjustment shall be made according to the inside diameter of the steel pipes to be joined with.



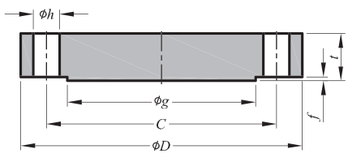
TR of nominal size 10A to 150A



WN of nominal size 10A to 600A



IT of nominal size 10A to 600A



BL of nominal size 10A to 600A

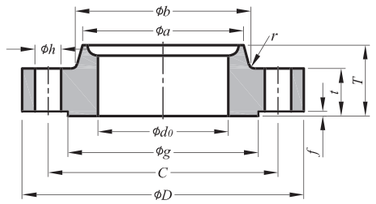
Unit : mm

Nominal Size	Depth of Socket	Norminal designa -tion of thread	Cham-fering[4]	Radius of Fillet	Raised face		Diameter of Bolt			Norm inal Bolt Size	Stopper	Taper of hub	
					Height	Diameter	Diam. of Bolt Circle	Num. of Bolt Holes	Diam. of Bolt Hole		SOH Type-C	WN	IT (Min)
A	S		c	r	f	g	C		h		l	x	x
10	10	Rc 3/8	-	4	1	46	65	4	15	M12	-	1.25	1.25
15	10	Rc 1/2	3	4	1	51	70	4	15	M12	-	1.25	1.25
20	13	Rc 3/4	3	4	1	56	75	4	15	M12	-	1.25	1.25
25	13	Rc 1	3	4	1	67	90	4	19	M16	-	1.25	1.25
32	13	Rc 1 1/4	4	5	2	76	100	4	19	M16	-	1.25	1.25
40	13	Rc 1 1/2	4	5	2	81	105	4	19	M16	-	1.25	1.25
50	16	Rc 2	4	5	2	96	120	8	19	M16	-	1.25	1.25
65	16	Rc 2 1/2	5	5	2	116	140	8	19	M16	6	1.25	1.25
80	16	Rc 3	5	6	2	132	160	8	23	M20	6	1.25	1.25
90	-	-	5	6	2	145	170	8	23	M20	6	1.25	1.25
100	-	Rc 4	5	6	2	160	185	8	23	M20	6	1.25	1.25
125	-	Rc 5	6	6	2	195	225	8	25	M22	6	1.25	1.25
150	-	Rc 6	6	6	2	230	260	12	25	M22	6	1.25	1.25
200	-	-	6	6	2	275	305	12	25	M22	6	1.25	1.25
250	-	-	6	6	2	345	380	12	27	M24	6	1.25	1.25
300	-	-	9	8	3	395	430	16	27	M24	6	1.25	1.25
350	-	-	9	8	3	440	480	16	33	M30×3	6	1.25	1.25
400	-	-	9	10	3	495	540	16	33	M30×3	7	1.25	1.25
450	-	-	9	10	3	560	605	20	33	M30×3	7	1.25	1.25
500	-	-	9	10	3	615	660	20	33	M30×3	7	1.25	1.25
550	-	-	9	10	3	670	720	20	39	M36×3	7	1.25	1.25
600	-	-	9	10	3	720	770	24	39	M36×3	7	1.25	1.25

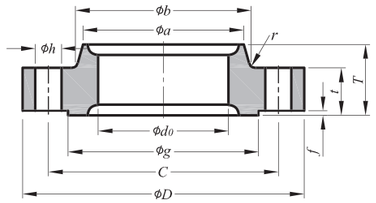
(3) With IT flanges, this dimension is shown for reference.

(4) This may be rounded off with the dimension c as a radius.

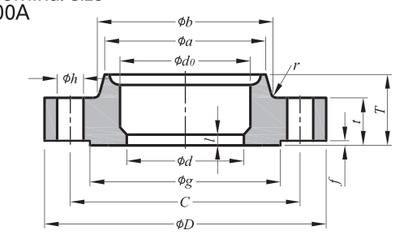
30K



SOH type A of nominal size
10A to 400A



SOH type B of nominal size
10A to 50A



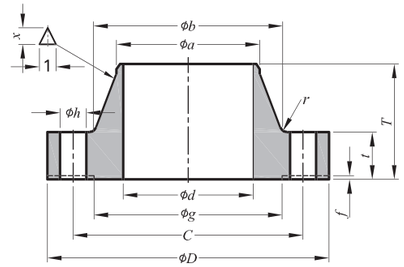
SOH type C of nominal size
65A to 400A

JIS B 2220-2004 (KS B 1503-2007)

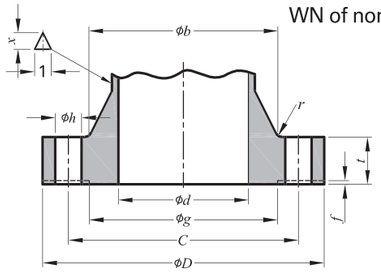
Unit : mm

Nominal Size	Outside Diam. of Applicable Pipe	Outside Diam. of Flange	Inside Diam. of Flange		Thickness of Flange	Total Length of Flange	Diameter of hub		Radius of Fillet	
			SOH	SOH, WN	IT	SO, LJ, TR, WN, IT, BL	SOH	WN	SO, SW, LJ, TR	WN	SO, SW, LJ, TR	WN, IT	SOH	WN, IT
A		D	d0	d(2)	d	t	T	T	a	a	b	b(3)	r	r(3)
10	17.3	110	17.8	-	-	16	24	-	30	-	34	-	4	-
15	21.7	115	22.2	16.1	15	18	26	45	36	21.7	40	40	5	6
20	27.2	120	27.7	21.4	20	18	28	45	42	27.2	46	44	5	6
25	34.0	130	34.5	27.2	25	20	30	48	50	34.0	54	52	5	6
32	42.7	140	43.2	35.5	32	22	32	52	60	42.7	64	62	6	6
40	48.6	160	49.1	41.2	40	22	34	54	66	48.6	70	70	6	6
50	60.5	165	61.1	52.7	50	22	36	57	82	60.5	86	84	6	8
65	76.3	200	77.1	65.9	65	26	40	69	102	76.3	106	104	8	8
80	89.1	210	90.0	78.1	80	28	44	73	115	89.1	121	118	8	8
90	101.6	230	102.6	90.2	90	30	46	74	128	101.6	134	130	8	8
100	114.3	240	115.4	102.3	100	32	48	76	141	114.3	147	142	8	8
125	139.8	275	141.2	126.6	125	36	54	86	166	139.8	172	172	8	10
150	165.2	325	166.6	151.0	150	38	58	95	196	165.2	204	202	8	10
200	216.3	370	218.0	199.9	200	42	64	102	248	216.3	256	254	8	10
250	267.4	450	269.5	248.8	250	48	72	118	306	267.4	314	312	10	12
300	318.5	515	321.0	297.9	300	52	78	127	360	318.5	370	366	10	15
350	355.6	560	358.1	333.4	335	54	84	134	402	355.6	412	406	12	15
400	406.4	630	409.0	381.0	380	60	92	149	456	406.4	468	462	15	20

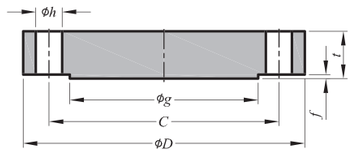
Notes :
(1) The facing of flanges shall conform to JIS B2202-2004
(2) Adjustment shall be made according to the inside diameter of the steel pipes to be joined with.
(3) With IT flanges, this dimension is shown for reference.



WN of nominal size 15A to 400A



IT of nominal size 15A to 400A

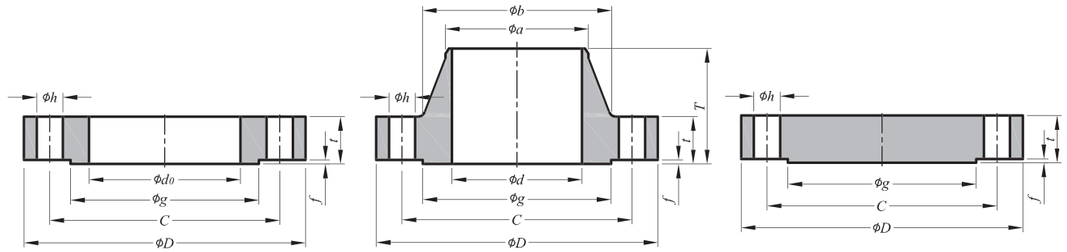


BL of nominal size 10A to 400A

Unit : mm

Nominal Size	Raised face		Diameter of Bolt			Nominal Bolt Size	Stopper	Taper of hub	
	Height	Diameter	Diam. of Bolt Circle	Num. of Bolt Holes	Diam. of Bolt Hole		SOH Type-C	WN	IT (Min)
	WN, IT								
A	f	g	C		h		l	x	x
10	1	52	75	4	19	M16	-	-	-
15	1	55	80	4	19	M16	-	1.25	1.25
20	1	60	85	4	19	M16	-	1.25	1.25
25	1	70	95	4	19	M16	-	1.25	1.25
32	2	80	105	4	19	M16	-	1.25	1.25
40	2	90	120	4	23	M20	-	1.25	1.25
50	2	105	130	8	19	M16	-	1.25	1.25
65	2	130	160	8	23	M20	6	1.25	1.25
80	2	140	170	8	23	M20	6	1.25	1.25
90	2	150	185	8	25	M22	6	1.25	1.25
100	2	160	195	8	25	M22	6	1.25	1.25
125	2	195	230	8	25	M22	6	1.25	1.25
150	2	235	275	12	27	M24	6	1.25	1.25
200	2	280	320	12	27	M24	6	1.25	1.25
250	2	345	390	12	33	M30×3	6	1.25	1.25
300	3	405	450	16	33	M30×3	6	1.25	1.25
350	3	450	495	16	33	M30×3	6	1.25	1.25
400	3	510	560	16	39	M36×3	7	1.25	1.25

40K



SOP of norminal size 10A to 400A

WN of norminal size 10A to 400A

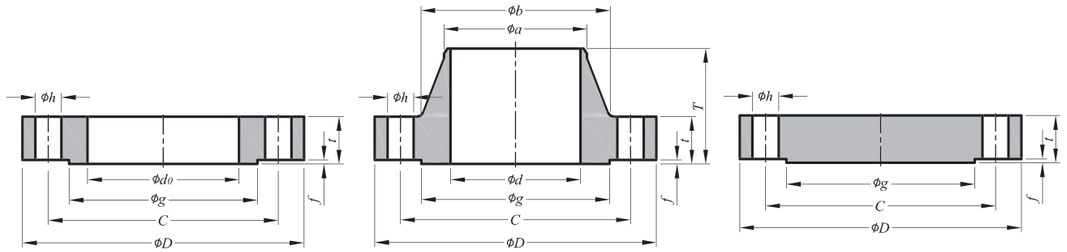
BL of norminal size 10A to 400A

JIS B2238-1996

Unit : mm

Nominal Size	Applicable Pipe	Outside Diam. of Flange	Outside Diam. of Flange	Thickness of Flange	Inside Diam. of Flange		Diameter of hub		Total Length of Flange	Raised face		Diameter of Bolt			Approx Weight(Kg)		
					SOP	WN				Height	Diameter	Diam. of Bolt Circle	Num. of Bolt Holes	Diam. of Bolt Hole			
A		D	t	d0	d	a	b	T	f	g	C		h	SOP	BL	WN
10	17.3	110	18	17.8	-	17.3	38	53	1	52	75	4	19	1.2	1.2	-
15	21.7	115	20	22.2	15.8	21.7	40	53	1	55	80	4	19	1.3	1.4	1.5
20	27.2	120	20	27.7	21.1	27.2	45	58	1	60	85	4	19	1.5	1.6	1.7
25	34.0	130	22	34.5	26.8	34.0	54	62	1	70	95	4	19	1.9	2.1	2.2
32	42.7	140	24	43.2	35.1	42.7	62	69	2	80	105	4	19	2.4	2.7	2.8
40	48.6	160	24	49.1	40.7	48.6	72	72	2	90	120	4	23	3.1	3.5	3.5
50	60.5	165	26	61.1	52.2	60.5	88	75	2	105	130	8	19	3.3	3.9	4.1
65	76.3	200	30	77.1	65.3	76.3	108	81	2	130	160	8	23	5.5	6.6	6.9
80	89.1	210	32	90.0	76.4	89.1	119	85	2	140	170	8	23	6.4	8.0	7.9
90	101.6	230	34	102.6	89.5	101.6	130	88	2	150	185	8	25	7.9	10.1	9.4
100	114.3	250	36	115.4	101.5	114.3	146	104	2	165	205	8	25	9.9	12.9	12.3
125	139.8	300	40	141.2	-	-	-	-	2	200	250	8	27	15.9	20.8	-
150	165.2	355	44	166.6	150.0	165.2	215	120	2	240	295	12	33	23.2	30.8	30.6
200	216.3	405	50	218.0	198.7	216.3	270	135	2	290	345	12	33	32.1	46.8	41.6
250	267.4	475	56	269.5	247.5	267.4	333	154	2	355	410	12	33	48.6	73.8	68.1
300	318.5	540	60	321.0	296.4	318.5	400	159	3	410	470	16	39	61.1	99.4	96.0
350	355.6	585	64	358.1	331.8	355.6	432	168	3	455	515	16	39	75.2	126.1	115.0
400	406.4	645	70	409.0	379.1	406.4	466	181	3	515	570	16	39	97.4	170.0	143.0

63K



SOP of norminal size 10A to 400A

WN of norminal size 10A to 400A

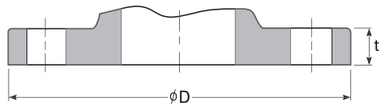
BL of norminal size 10A to 400A

JIS B2238-1996

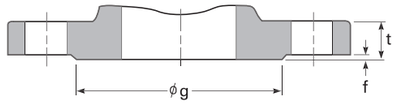
Unit : mm

Nominal Size	Applicable Pipe	Outside Diam. of Flange	Outside Diam. of Flange	Thickness of Flange	Inside Diam. of Flange		Diameter of hub		Total Length of Flange	Raised face		Diameter of Bolt			Approx Weight(Kg)		
					SOP	WN				Height	Diameter	Diam. of Bolt Circle	Num. of Bolt Holes	Diam. of Bolt Hole			
A		D	t	d0	d	a	b	T	f	g	C		h	SOP	BL	WN
10	17.3	115	23	17.8	-	17.3	40	61	1	52	80	4	19	1.6	1.7	-
15	21.7	120	23	22.2	15.8	21.7	42	61	1	55	85	4	19	1.8	1.9	1.9
20	27.2	135	25	27.7	21.1	27.2	46	71	1	60	95	4	23	2.4	2.5	2.5
25	34.0	140	27	34.5	26.8	34.0	56	74	1	70	100	4	23	2.7	2.9	3.5
32	42.7	150	30	43.2	35.1	42.7	60	75	2	80	110	4	23	3.4	3.8	3.7
40	48.6	175	32	49.1	40.7	48.6	75	85	2	90	130	4	25	5.1	5.6	5.5
50	60.5	185	34	61.1	52.2	60.5	92	104	2	105	145	8	23	5.5	6.3	6.5
65	76.3	220	38	77.1	65.3	76.3	118	107	2	130	175	8	25	5.8	7.2	10.3
80	89.1	230	40	90.0	76.4	89.1	130	120	2	140	185	8	25	9.9	11.9	12.4
90	101.6	255	42	102.6	89.5	101.6	140	126	2	150	205	8	27	12.7	15.4	15.2
100	114.3	270	44	115.4	101.5	114.3	154	126	2	165	220	8	27	14.7	18.3	17.7
125	139.8	325	50	141.2	-	-	-	-	2	200	265	8	33	23.8	30.0	-
150	165.2	365	54	166.6	150.0	165.2	230	173	2	240	305	12	33	30.9	40.2	39.4
200	216.3	425	60	218.0	198.7	216.3	280	215	2	290	360	12	33	44.6	62.3	60.1
250	267.4	500	68	269.5	247.5	267.4	348	256	2	355	430	12	39	67.1	97.7	114.0
300	318.5	560	77	321.0	296.4	318.5	402	286	3	410	485	16	39	88.9	138.1	154.0
350	355.6	615	81	358.1	331.8	355.6	438	301	3	455	530	16	46	108.5	172.9	191.0
400	406.4	680	89	409.0	379.1	406.4	490	314	3	515	590	16	46	144.2	236.5	247.0

FACING 1



Full face(FF)



Raised face(RF)

KS/JIS FLANGES

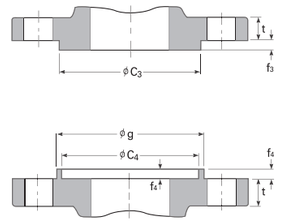
Unit : mm

Nominal size A	Raised face (RF) Nominal pressure									
	5K		10K		16K		20K		30K	
	g	f	g	f	g	f	g	f	g	f
10	39	1	46	1	46	1	46	1	52	1
15	44	1	51	1	51	1	51	1	55	1
20	49	1	56	1	56	1	56	1	60	1
25	59	1	67	1	67	1	67	1	70	1
32	70	2	76	2	76	2	76	2	80	2
40	75	2	81	2	81	2	81	2	90	2
50	85	2	96	2	96	2	96	2	105	2
65	110	2	116	2	116	2	116	2	130	2
80	121	2	126	2	132	2	132	2	140	2
90	131	2	136	2	145	2	145	2	150	2
100	141	2	151	2	160	2	160	2	160	2
125	176	2	182	2	195	2	195	2	195	2
150	106	2	212	2	230	2	230	2	235	2
175	232	2	237	2	-	-	-	-	-	-
200	252	2	262	2	275	2	275	2	280	2
225	177	2	282	2	-	-	-	-	-	-
250	317	2	324	2	345	2	345	2	345	2
300	360	3	368	3	395	3	395	3	405	3
350	403	3	413	3	440	3	440	3	450	3
400	463	3	475	3	495	3	495	3	510	3
450	523	3	530	3	560	3	560	3	-	-
500	573	3	585	3	615	3	615	3	-	-
550	630	3	340	3	670	3	670	3	-	-
600	680	3	390	3	720	3	720	3	-	-
650	735	3	740	3	-	-	-	-	-	-
700	785	3	800	3	-	-	-	-	-	-
750	840	3	855	3	-	-	-	-	-	-
800	890	3	905	3	-	-	-	-	-	-
850	940	3	955	3	-	-	-	-	-	-
900	990	3	1005	3	-	-	-	-	-	-
1000	1090	3	1110	3	-	-	-	-	-	-
1100	1200	3	1220	3	-	-	-	-	-	-
1200	1305	3	1325	3	-	-	-	-	-	-
1350	1460	3	1480	3	-	-	-	-	-	-
1500	1615	3	1635	3	-	-	-	-	-	-

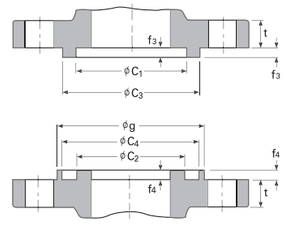
Remarks :

1. Dimension D of full face (FF) shall conform to the outside diameter D of the flange of the attached table 4 to 7.
2. The thickness of the flange t shall conform to the attached tables 4 to 9.
3. Dimension g in male-female face (MF) and tongue and groove (TG) shall conform to dimension g of raised face (RF).

FACING 2



Male-female face(MF)



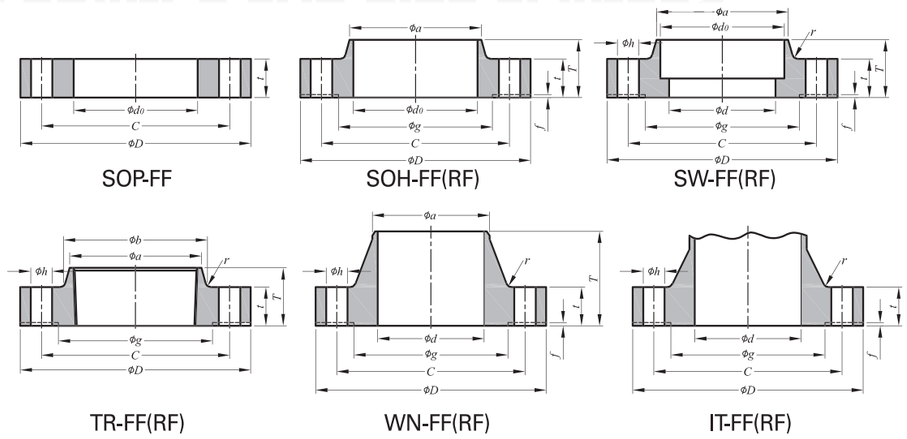
Tongue and groove(TG)

Unit : mm

Nominal size A	Male·Female face (MF)				Tongue and groove (TG)					
	Male seat (MF·M)		Female seat (MF·F)		Tongue seat (TG·T)			Groove seat (TG·G)		
	C	f	C	f	C	C	f	C	C	f
10	38	6	39	5	28	38	6	27	39	5
50	42	6	43	5	32	42	6	31	43	5
20	50	6	51	5	38	50	6	37	51	5
25	60	6	61	5	45	60	6	44	61	5
32	70	6	71	5	55	70	6	54	71	5
40	75	6	76	5	60	75	6	59	76	5
50	90	6	91	5	70	90	6	69	91	5
65	110	6	111	5	90	110	6	89	111	5
80	120	6	121	5	100	120	6	99	121	5
90	130	6	131	5	110	130	6	109	131	5
100	145	6	146	5	125	145	6	124	146	5
125	175	6	176	5	150	175	6	149	176	5
150	215	6	216	5	190	215	6	189	216	5
175	-	-	-	-	-	-	-	-	-	-
200	260	6	261	5	230	260	6	229	261	5
220	-	-	-	-	-	-	-	-	-	-
250	325	6	326	5	295	325	6	294	326	5
300	375	6	376	5	340	375	6	339	376	5
350	415	6	416	5	380	415	6	379	416	5
400	175	6	476	5	440	175	6	439	476	5
450	523	6	524	5	483	523	6	482	524	5
500	575	6	576	5	535	575	6	534	576	5
550	652	6	626	5	585	652	6	584	626	5
600	675	6	676	5	635	675	6	634	676	5
650	727	6	728	5	682	727	6	681	728	5
700	777	6	778	5	732	777	6	731	778	5
750	832	6	833	5	787	832	6	786	833	5
800	882	6	833	5	837	882	6	836	833	5
850	934	6	935	5	889	934	6	888	935	5
900	987	6	988	5	937	987	6	936	988	5
1000	1092	6	1094	5	1042	1092	6	1040	1094	5
1100	1192	6	1194	5	1142	1192	6	1140	1194	5
1200	1292	6	1294	5	1237	1292	6	1235	1294	5
1350	1442	6	1444	5	1387	1442	6	1385	1444	5
1500	1592	6	1594	5	1537	1592	6	1535	1594	5

4. The female seat(MF·F) and the groove (TG·G) for nominal pressure 5K and 10K shall be of the shapes shown by an imaginary line of the figures.

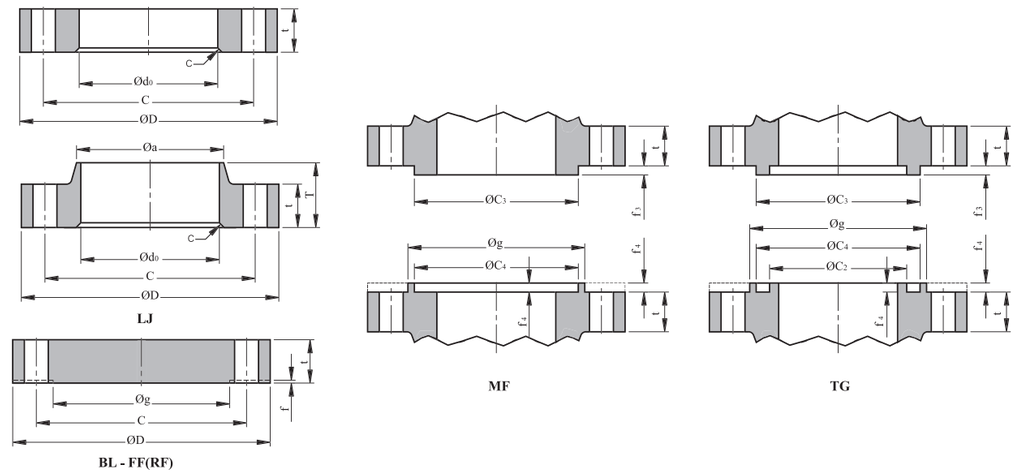
TOLERANCE FOR PIPE FLANEES



Dimensional tolerance on flange

Unit : mm

Dimension		Type of flange	Gasket face	Dimensional Division	Dimensional tolerance
Outside diameter of flange	D	Except for IT	-	600 or less	±1.5
				Over 600	±3
		IT	-	1000 or less	Not specified for plus side values -2
				Over 1000	Not specified for plus side values -3
Diameter of bolt centre circle	C	ALL	-	950 or less	±0.8
				Over 950	±1.5
Pitch of bolt hole	-	ALL	-	-	±0.8
Inside Diameter	d0	SOP, SOH, SW, LJ	-	100 or less	+0.5 0
				Over 100 to and incl. 400	+1 0
				Over 400 to and incl. 600	+1.5 0
				Over 600 to and incl. 800	+2 0
				Over 800 to and incl. 1000	+2.5 0
				Over 1000	+3 0
Inside Diameter	d	SW, WN	-	100 or less	0 -0.5
				Over 100 to and incl. 400	0 -1
				Over 400 to and incl. 600	0 -1.5
				Over 600 to and incl. 800	0 -2
				Over 800 to and incl. 1000	0 -2.5
				Over 1000	0 -3
Diameter of gasket face	g	SOH, SW, TR WN, IT, BL	RF, MF, TG	700 or less	±0.8
				Over 700	±1.5
Diameter of gasket face	C1 C2 C3 C4	Except for LJ	MF, TG	500 or less	±0.3
				Over 500 to and incl. 1000	±0.35
				Over 1000 to and incl. 1500	±0.4
				Over 1500	±0.5
Height of gasket face	f3 f4	Except for LJ	MF, TG	-	±0.2



Unit : mm

Dimension		Type of flange	Gasket face	Dimensional Division	Dimensional tolerance
Thickness of flange	t (1) (2)	Except for LJ	FF, MF, TG	20 or less	+1.5 0
				Over 20 to and incl. 50	+2 0
				Over 50	+3 0
		LJ	-	20 or less	+1.5 0
				Over 20 to and incl. 50	+2 0
				Over 50	+3 0
Thickness of flange	t-f (1) (2)	SOH, SW, TR WN, IT, BL	RF	20 or less	+1.5 0
				Over 20 to and incl. 50	+2 0
				Over 50	+3 0
Diameter of hub Small diameter side	a	SOH, SW, LJ TR, WN	-	220 or less	+2 0
				Over 220 to and incl. 650	+4 0
				Over 650	+8 0
Total length of flange	T	SOH, SW, LJ, TR	-	-	±2
		WN	-	200 or less	+2 0
				Over 200	+3 0
Chamfering	c	LJ	-	6 or less	+0.8 0
				Over 6	+1.6 0
Parallelism between gasket face and bolt nut bearing surface	-	Except for LJ	ALL	-	Within 1 degree

Notes :

(1) The tolerance on thickness of integral flange (IT) of piping parts with which the dimension between flange facings is limited to a specific value may be set at twice the specified value.

(2) For the spot facing of flanges, if they are so processed, the thickness is permitted in the minus side to 70% of the tolerance on thickness of spot facing given in the table.

JIS Material Chemical Composition & Mechanical Requirements

MATE-RIAL		Chemical Composition (%)												Mechanical Requirements						
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	Sn	Y.S (N/mm²)	T.S (N/mm²)	E.L(%) axial	E.L(%) tangen.	R.A(%) axial	R.A(%) tangen.	H.B
SF440A	Max.	0.60	0.50	1.20	0.030	0.035									540					121
	Min.		0.15	0.30										225	440	24.0	19.0	45.0	35.0	
SF490A	Max.	0.60	0.50	1.20	0.030	0.035									590					134
	Min.		0.15	0.30										245	490	22.0	17.0	40.0	30.0	
SFVC 1	Max.	0.30	0.35	1.35	0.030	0.030									560					
	Min.			0.40										205	410	21.0		38.0		
SFVC 2A	Max.	0.35	0.35	1.10	0.030	0.030									640					
	Min.			0.40										245	490	18.0		33.0		
SFVC 2B	Max.	0.30	0.35	1.35	0.030	0.030									640					
	Min.			0.70										245	490	18.0		38.0		
SFL 1	Max.	0.30	0.35	1.35	0.030	0.030									590					
	Min.													225	440	22.0		38.0		
SFL 2	Max.	0.30	0.35	1.35	0.030	0.030									640					
	Min.													245	490	19.0		30.0		
S15C	Max.	0.18	0.35	0.60	0.030	0.035													111~167	
	Min.	0.13	0.15	0.30										235	370	30.0				
S20C	Max.	0.23	0.35	0.60	0.030	0.035													116~174	
	Min.	0.18	0.15	0.30										245	400	28.0				
S25C	Max.	0.28	0.35	0.60	0.030	0.035													123~183	
	Min.	0.22	0.15	0.30										265	440	27.0				
S30C	Max.	0.33	0.35	0.90	0.030	0.035													137~197	
	Min.	0.27	0.15	0.60										285	470	25.0				
S35C	Max.	0.38	0.35	0.90	0.030	0.035													149~207	
	Min.	0.32	0.15	0.60										305	510	23.0				
S40C	Max.	0.43	0.35	0.90	0.030	0.035													156~217	
	Min.	0.37	0.15	0.60										325	540	22.0				
S45C	Max.	0.48	0.35	0.90	0.030	0.035													167~229	
	Min.	0.42	0.15	0.60										345	570	20.0				
SFVA F1	Max.	0.30	0.35	0.90	0.030	0.030			0.65						660					
	Min.			0.60					0.45					275	480	18.0		35.0		
SFVA F5A/B	Max.	0.15	0.50	0.60	0.030	0.030		6.00	0.65					A:245	410~590	18.0		40.0		
	Min.			0.30				4.00	0.45					B:275	480~660	18.0		35.0		
SFVA F9	Max.	0.15	1.00	0.60	0.030	0.030		10.00	1.10						760					
	Min.		0.50	0.30				8.00	0.90					380	590	18.0		40.0		
SFVA F11A/B	Max.	0.20	1.00	0.80	0.030	0.030		1.50	0.65					A:275	A:480~660	18.0		35.0		
	Min.		0.50	0.30				1.00	0.45					B:315	B:520~690	18.0		35.0		
SFVA F12	Max.	0.20	0.60	0.80	0.030	0.030		1.25	0.65						660					
	Min.			0.30				0.80	0.45					275	480	18.0		35.0		
SFVA F22A/B	Max.	0.15	0.50	0.60	0.030	0.030		2.50	1.10					A:205	A:410~590	18.0		40.0		
	Min.			0.30				2.00	0.90					B:315	B:520~690	18.0		35.0		
SFL3	Max.	0.20	0.35	0.90	0.030	0.030	3.75								640					
	Min.						3.25							255	490	19.0		35.0		
SFVQ 1A	Max.	0.25	0.40	1.50	0.030	0.030	1.00	0.25	0.60		0.05				730					
	Min.			1.20			0.40		0.45					345	550	16.0		38.0		
SFVQ 2A	Max.	0.27	0.40	1.00	0.030	0.030	1.00	0.45	0.70		0.05				730					
	Min.			0.50			0.50	0.25	0.55					345	550	16.0				
SFVQ 3	Max.	0.23	0.40	0.40	0.020	0.020	3.90	2.00	0.60		0.03				790					
	Min.			0.20			2.75	1.50	0.40					490	620	18.0		48.0		
SFVC 2B	Max.	0.30	0.35	1.35	0.030	0.030									640					
	Min.			0.70										245	490	18.0		38.0		
SUS F304	Max.	0.08	1.00	2.00	0.040	0.030	11.00	20.00						130under : 205	520	43.0		50.0		187
	Min.						8.00	18.00						130~200 : 205	480	29.0		45.0		187
SUS F304L	Max.	0.03	1.00	2.00	0.040	0.030	13.00	20.00						130under : 175	480	29.0		50.0		187
	Min.						9.00	18.00						130~200 : 175	450	29.0		45.0		187
SUS F304H	Max.	0.10	1.00	2.00	0.040	0.030	12.00	20.00						130under : 205	520	43.0		50.0		187
	Min.	0.04					8.00	18.00						130~200 : 205	480	29.0		45.0		187
SUS F310	Max.	0.15	1.00	2.00	0.040	0.030	22.00	26.00						130under : 205	520	34.0		50.0		187
	Min.						19.00	24.00						130~200 : 205	480	29.0		40.0		187
SUS F316	Max.	0.08	1.00	2.00	0.040	0.030	14.00	18.00	3.00					130under : 205	520	43.0		50.0		187
	Min.						10.00	16.00	2.00					130~200 : 205	480	29.0		45.0		187
SUS F316L	Max.	0.03	1.00	2.00	0.040	0.030	15.00	18.00	3.00					130under : 175	480	29.0		50.0		187
	Min.						12.00	16.00	2.00					130~200 : 175	450	29.0		45.0		187
SUS F316H	Max.	0.10	1.00	2.00	0.040	0.030	14.00	18.00	3.00					130under : 205	520	43.0		50.0		187
	Min.	0.04					10.00	16.00	2.00					130~200 : 205	480	29.0		45.0		187
SUS F317	Max.	0.08	1.00	2.00	0.040	0.030	15.00	20.00	4.00					130under : 205	520	29.0		50.0		187
	Min.						11.00	18.00	3.00					130~200 : 205	480	29.0		50.0		187
SUS F317L	Max.	0.03	1.00	2.00	0.040	0.030	15.00	20.00	4.00					130under : 175	480	29.0		50.0		187
	Min.						11.00	18.00	3.00					130~200 : 175	450	29.0		50.0		187
SUS F321	Max.	0.08	1.00	2.00	0.040	0.030	12.00			Ti: 5*C%~0.60				130under : 205	520	43.0		50.0		187
	Min.						9.00	17.00						130~200 : 205	480	29.0		45.0		187
SUS F347	Max.	0.08	1.00	2.00	0.040	0.030	13.00	20.00		Nb : 10*C%~1.00				130under : 205	520	43.0		50.0		187
	Min.						9.00	17.00						130~200 : 205	480	29.0		45.0		187
SUS F410	Max.	0.15	1.00	1.00	0.040	0.030	0.50	13.50						A 275above B 380above C 585above D 760above	A 480above B 590above C 760above D 900above	16above 16above 14above 11above				143~187 167~229 217~302 262~321
	Min.							11.50										35.0		

JPI-7S-15-2005

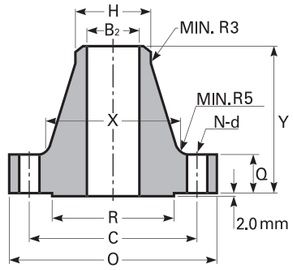




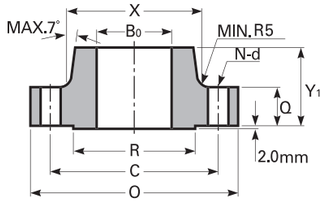



CLASS 150/300 FLANGES

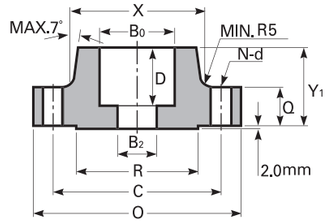
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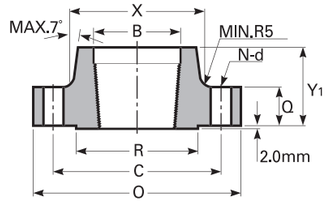
WELDING NECK



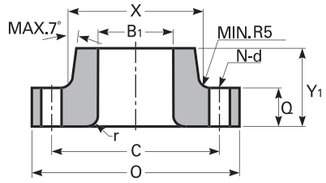
SLIP-ON



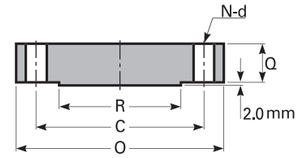
SOCKET WELDING



THREADED



LAP JOINT



BLIND

CLASS 150

Unit : mm

Nominal Pipe Size		Outside Diam.	Bore			Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thickness		Length Thru Hub		
			SO, SW	WN, SW	LJ				WN, SO, SW, THRED, BL	LJ	SO, SW THRED	LJ	WN
A	B	O	B0	B2	B1	X	H	R	Q		Y1	Y2	Y
15	1/2	90	22.2	16.1	23.4	30	21.7	34.9	9.6	11.2	14	16	46
20	3/4	100	27.7	21.4	28.9	38	27.2	42.9	11.2	12.7	14	16	51
25	1	110	34.5	27.2	35.6	49	34.0	50.8	12.7	14.3	16	17	54
(32)	(1 1/4)	115	43.2	35.5	44.3	59	42.7	63.5	14.3	15.9	19	21	56
40	1 1/2	125	49.1	41.2	50.4	65	48.6	73.0	15.9	17.5	21	22	60
50	2	150	61.1	52.7	62.7	78	60.5	92.1	17.5	19.1	24	25	62
65	2 1/2	180	77.1	65.9	78.7	90	76.3	104.8	20.7	22.3	27	29	68
80	3	190	90.0	78.1	91.6	108	89.1	127.0	22.3	23.9	29	30	68
(90)	(3 1/2)	215	102.6	90.2	104.1	122	101.6	139.7	22.3	23.9	30	32	70
100	4	230	115.4	102.3	116.9	135	114.3	157.2	22.3	23.9	32	33	75
(125)	(5)	255	141.2	126.6	143.0	164	139.8	185.7	22.3	23.9	35	36	87
150	6	280	166.6	151.0	168.4	192	165.2	215.9	23.9	25.4	38	40	87
200	8	345	218.0	199.9	219.5	246	216.3	269.9	27.0	28.6	43	44	100
250	10	405	269.5	248.8	271.7	305	267.4	323.8	28.6	30.2	48	49	100
300	12	485	321.0	297.9	322.8	365	318.5	381.0	30.2	31.8	54	56	113
350	14	535	358.1	-	360.2	400	355.6	412.8	33.4	35.0	56	79	125
400	16	595	409.0	-	411.2	457	406.4	469.9	35.0	36.6	62	87	125
450	18	635	460.0	-	462.3	505	457.2	533.4	38.1	39.7	67	97	138
500	20	700	511.0	-	514.4	559	508.0	584.2	41.3	42.9	71	103	143
600	24	815	613.0	-	616.0	663	609.6	692.2	46.1	47.7	81	111	151

CLASS 300

Unit : mm

Nominal Pipe Size		Outside Diam.	Bore			Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thickness		Length Thru Hub		
			SO, SW	WN, SW	LJ				WN, SO, SW, THRED, BL	LJ	SO, SW THRED	LJ	WN
A	B	O	B0	B2	B1	X	H	R	Q		Y1	Y2	Y
15	1/2	95	22.2	16.1	23.4	38	21.7	34.9	12.7	14.3	21	22	51
20	3/4	115	27.7	21.4	28.9	48	27.2	42.9	14.3	15.9	24	25	56
25	1	125	34.5	27.2	35.6	54	34.0	50.8	15.9	17.5	25	27	60
(32)	(1 1/4)	135	43.2	35.5	44.3	64	42.7	63.5	17.5	19.1	25	27	64
40	1 1/2	155	49.1	41.2	50.4	70	48.6	73.0	19.1	20.7	29	30	67
50	2	165	61.1	52.7	62.7	84	60.5	92.1	20.7	22.3	32	33	68
65	2 1/2	190	77.1	65.9	78.7	100	76.3	104.8	23.9	25.4	37	38	75
80	3	210	90.0	78.1	91.6	117	89.1	127.0	27.0	28.6	41	43	78
(90)	(3 1/2)	230	102.6	90.2	104.1	133	101.6	139.7	28.6	30.2	43	44	79
100	4	255	115.4	102.3	116.9	146	114.3	157.2	30.2	31.8	46	48	84
(125)	(5)	280	141.2	126.6	143.0	178	139.8	185.7	33.4	35.0	49	51	97
150	6	320	166.6	151.0	168.4	206	165.2	215.9	35.0	36.6	51	52	97
200	8	380	218.0	199.9	219.5	260	216.3	269.9	39.7	41.3	60	62	110
250	10	445	269.5	248.8	271.7	321	267.4	323.8	46.1	47.7	65	95	116
300	12	520	321.0	297.9	322.8	375	318.5	381.0	49.3	50.8	71	102	129
350	14	585	358.1	-	360.2	425	355.6	412.8	52.4	54.0	75	111	141
400	16	650	409.0	-	411.2	483	406.4	469.9	55.6	57.2	81	121	144
450	18	710	460.0	-	462.3	533	457.2	533.4	58.8	60.4	87	130	157
500	20	775	511.0	-	514.4	587	508.0	584.2	62.0	63.5	94	140	160
600	24	915	613.0	-	616.0	702	609.6	692.2	68.3	69.9	105	152	167

* WN: Welding Neck *SO: Slip-On *SW: Socket Welding *LJ: Lap Joint *THRED: Threaded *BL: Blind

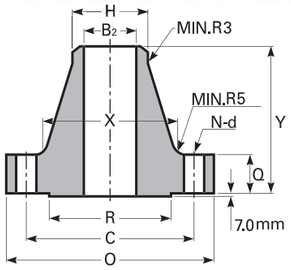
Unit : mm

Depth of Socket	Radius of Fillet	Drilling			Bolting				Approximate Weight (Kg)				
		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Machine Bolt Length	Stud Bold Length	Ring Joint	Welding Neck	Slip-On Threaded	Lap-Joint	Blind	Socket Welding
D	r	C	N	d									
10	3	60.3	4	16	1/2-13UNC	50	55	-	0.51	0.41	0.47	0.5	0.42
11	3	69.9	4	16	1/2-13UNC	50	65	-	0.77	0.57	0.64	0.9	0.59
13	3	79.4	4	16	1/2-13UNC	55	65	75	1.06	0.78	0.88	0.9	0.81
14	5	88.9	4	16	1/2-13UNC	55	70	85	1.39	1.03	1.11	1.4	1.07
16	6	98.4	4	16	1/2-13UNC	65	70	85	1.80	1.32	1.41	1.8	1.38
17	8	120.7	4	19	5/8-11UNC	70	80	95	2.72	2.09	2.20	2.3	2.16
19	8	139.7	4	19	5/8-11UNC	75	90	100	4.26	3.25	3.41	3.2	3.36
21	10	152.4	4	19	5/8-11UNC	75	90	100	5.23	3.91	4.06	4.1	4.07
-	10	177.8	8	19	5/8-11UNC	75	90	100	6.45	4.86	5.07	5.9	5.05
-	11	190.5	8	19	5/8-11UNC	75	90	100	7.40	5.35	5.55	7.7	5.55
-	11	215.9	8	22	3/4-10UNC	85	95	110	9.54	6.22	6.41	9.1	6.54
-	13	241.3	8	22	3/4-10UNC	85	100	115	12.10	7.76	7.93	11.8	8.22
-	13	298.5	8	22	3/4-10UNC	90	110	120	20.20	12.60	12.90	20.4	-
-	13	362.0	12	26	7/8-9UNC	100	115	125	27.90	17.60	17.90	31.8	-
-	13	431.8	12	26	7/8-9UNC	100	120	135	43.40	27.80	28.30	49.9	-
-	13	476.3	12	29	1-8UNC	115	135	145	57.50	35.20	-	63.5	-
-	13	539.8	16	29	1-8UNC	115	135	145	72.30	45.30	-	81.6	-
-	13	577.9	16	32	1 1/8-8UNC	125	145	160	87.80	49.70	-	99.8	-
-	13	635.0	20	32	1 1/8-8UNC	140	160	170	111.00	63.50	-	129.3	-
-	13	749.3	20	35	1 1/4-8UNC	155	170	185	159.00	90.50	-	195.0	-

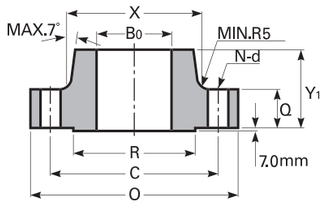
Unit : mm

Depth of Socket	Radius of Fillet	Drilling			Bolting				Approximate Weight (Kg)				
		Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Machine Bolt Length	Stud Bold Length	Ring Joint	Welding Neck	Slip-On Threaded	Lap-Joint	Blind	Socket Welding
D	r	C	N	d									
10	3	66.7	4	16	1/2-13UNC	55	65	75	0.81	0.65	0.72	0.65	0.67
11	3	82.6	4	19	5/8-11UNC	65	75	90	1.28	1.10	1.21	1.09	1.13
13	3	88.9	4	19	5/8-11UNC	65	75	90	1.62	1.35	1.46	1.38	1.40
14	5	98.4	4	19	5/8-11UNC	70	85	95	2.12	1.69	1.81	1.82	1.76
16	6	114.3	4	22	3/4-10UNC	75	90	100	3.02	2.54	2.70	2.70	2.62
17	8	127.0	8	19	5/8-11UNC	75	90	100	3.54	2.92	3.11	3.18	3.14
19	8	149.2	8	22	3/4-10UNC	85	100	115	5.31	4.24	4.43	4.86	4.48
21	10	168.3	8	22	3/4-10UNC	90	110	120	7.32	5.94	6.14	6.90	6.30
-	10	184.2	8	22	3/4-10UNC	95	110	125	9.13	7.90	8.15	8.79	-
-	11	200.0	8	22	3/4-10UNC	95	115	125	11.80	9.71	10.00	11.60	-
-	11	235.0	8	22	3/4-10UNC	110	120	135	16.00	12.40	12.60	15.50	-
-	13	269.9	12	22	3/4-10UNC	110	120	140	21.00	16.20	16.50	21.20	-
-	13	330.2	12	26	7/8-9UNC	120	140	150	32.70	24.80	25.30	34.50	-
-	13	387.4	16	29	1-8UNC	140	160	170	47.70	35.90	41.40	53.90	-
-	13	450.8	16	32	1 1/8-8UNC	145	170	185	69.40	51.50	58.70	78.90	-
-	13	514.4	20	32	1 1/8-8UNC	160	180	190	95.40	70.10	-	106.00	-
-	13	571.5	20	35	1 1/4-8UNC	165	190	205	122.00	90.40	-	139.00	-
-	13	628.6	24	35	1 1/4-8UNC	170	195	210	153.00	109.00	-	175.00	-
-	13	685.8	24	35	1 1/4-8UNC	185	205	220	188.00	136.00	-	222.00	-
-	13	812.8	24	42	1 1/2-8UNC	205	230	255	277.00	204.00	-	382.00	-

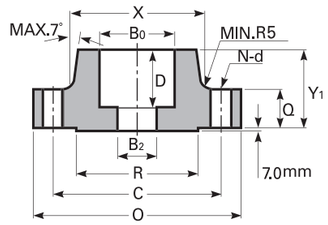
CLASS 400/600 FLANGES



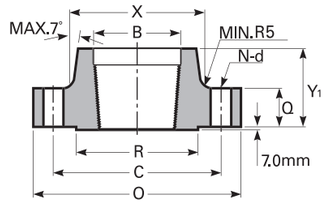
WELDING NECK



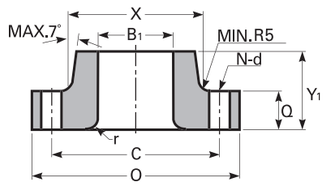
SLIP-ON



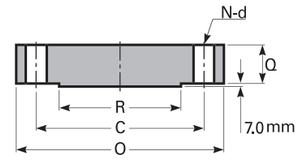
SOCKET WELDING



THREADED



LAP JOINT



BLIND

CLASS 400

Unit : mm

Nominal Pipe Size		Outside Diam.	Bore			Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thickness	Length Thru Hub			Depth of Socket
			SO, SW	WN, SW	LJ					SO, SW THRED	LJ	WN	
A	B	O	B0	B2	B1	X	H	R	Q	Y1	Y2	Y	D
15	1/2	95	22.2	To be Specified by Purchaser.	23.4	38	21.7	34.9	14.3	22	22	52	10
20	3/4	115	27.7		28.9	48	27.2	42.9	15.9	25	25	57	11
25	1	125	34.5		35.6	54	34.0	50.8	17.5	27	27	62	13
(32)	(1 1/4)	135	43.2		44.3	64	42.7	63.5	20.7	29	29	67	14
40	1 1/2	155	49.1		50.4	70	48.6	73.0	22.3	32	32	70	16
50	2	165	61.1		62.7	84	60.5	92.1	25.4	37	37	73	17
65	2 1/2	190	77.1		78.7	100	76.3	104.8	28.6	41	41	79	19
80	3	210	90.0		91.6	117	89.1	127.0	31.8	46	46	83	21
(90)	(3 1/2)	230	102.6		104.1	133	101.6	139.7	35.0	49	49	86	-
100	4	255	115.4		116.9	146	114.3	157.2	35.0	51	51	89	-
(125)	(5)	280	141.2		143.0	178	139.8	185.7	38.1	54	54	102	-
150	6	320	166.6		168.4	206	165.2	215.9	41.3	57	57	103	-
200	8	380	218.0		219.5	260	216.3	269.9	47.7	68	68	117	-
250	10	445	269.5		271.7	321	267.4	323.8	54.0	73	102	124	-
300	12	520	321.0		322.8	375	318.5	381.0	57.2	79	108	137	-
350	14	585	358.1		360.2	425	355.6	412.8	60.4	84	117	149	-
400	16	650	409.0		411.2	483	406.4	469.9	63.5	94	127	152	-
450	18	710	460.0		462.3	533	457.2	533.4	66.7	98	137	165	-
500	20	775	511.0		514.4	587	508.0	584.2	69.9	102	146	168	-
600	24	915	613.0		616.0	702	609.6	692.2	76.2	114	159	175	-

CLASS 600

Unit : mm

Nominal Pipe Size		Outside Diam.	Bore			Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thickness	Length Thru Hub			Depth of Socket
			SO, SW	WN, SW	LJ					SO, SW THRED	LJ	WN	
A	B	O	B0	B2	B1	X	H	R	Q	Y1	Y2	Y	D
15	1/2	95	22.2	To be Specified by Purchaser.	23.4	38	21.7	34.9	14.3	22	22	52	10
20	3/4	115	27.7		28.9	48	27.2	42.9	15.9	25	25	57	11
25	1	125	34.5		35.6	54	34.0	50.8	17.5	27	27	62	13
(32)	(1 1/4)	135	43.2		44.3	64	42.7	63.5	20.7	29	29	67	14
40	1 1/2	155	49.1		50.4	70	48.6	73.0	22.3	32	32	70	16
50	2	165	61.1		62.7	84	60.5	92.1	25.4	37	37	73	17
65	2 1/2	190	77.1		78.7	100	76.3	104.8	28.6	41	41	79	19
80	3	210	90.0		91.6	117	89.1	127.0	31.8	46	46	83	21
(90)	(3 1/2)	230	102.6		104.1	133	101.6	139.7	35.0	49	49	86	-
100	4	275	115.4		116.9	152	114.3	157.2	38.1	54	54	102	-
(125)	(5)	330	141.2		143.0	189	139.8	185.7	44.5	60	60	114	-
150	6	355	166.6		168.4	222	165.2	215.9	47.7	67	67	117	-
200	8	420	218.0		219.5	273	216.3	269.9	55.6	76	76	133	-
250	10	510	269.5		271.7	343	267.4	323.8	63.5	86	111	152	-
300	12	560	321.0		322.8	400	318.5	381.0	66.7	92	117	156	-
350	14	605	358.1		360.2	432	355.6	412.8	69.9	94	127	165	-
400	16	685	409.0		411.2	495	406.4	469.9	76.2	106	140	178	-
450	18	745	460.0		462.3	546	457.2	533.4	82.6	117	152	184	-
500	20	815	511.0		514.4	610	508.0	584.2	88.9	127	165	190	-
600	24	940	613.0		616.0	718	609.6	692.2	101.6	140	184	203	-

* WN: Welding Neck *SO: Slip-On *SW: Socket Welding *LJ: Lap Joint *THRED: Threaded *BL: Blind

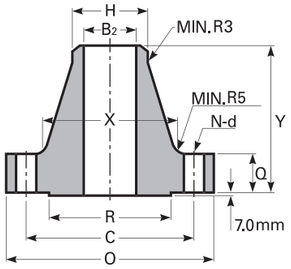
Unit : mm

Radius of Fillet	Drilling			Bolting			Approximate Weight (Kg)			
	Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Stud Bold Length		Welding Neck	Slip-On	Blind	Socket Welding
					Raised Face	Ring Joint				
r	C	N	d							
3	66.7	4	16	1/2-13UNC	75	75	0.33	0.74	0.76	0.73
3	82.6	4	19	5/8-11UNC	90	90	1.44	1.24	1.27	1.29
3	88.9	4	19	5/8-11UNC	90	90	1.81	1.51	1.59	1.58
5	98.4	4	19	5/8-11UNC	95	95	2.49	2.03	2.24	2.14
6	114.3	4	22	3/4-10UNC	110	110	3.55	3.01	3.30	3.14
8	127.0	8	19	5/8-11UNC	110	110	4.34	3.62	4.11	3.82
8	149.2	8	22	3/4-10UNC	120	120	6.41	5.20	6.20	5.57
10	168.3	8	22	3/4-10UNC	125	125	8.62	7.08	8.51	7.59
10	184.2	8	16	7/8-9UNC	140	140	10.80	8.86	10.90	-
11	200.0	8	26	7/8-9UNC	140	140	13.50	11.10	13.70	-
11	235.0	8	26	7/8-9UNC	145	145	16.10	14.20	18.60	-
13	269.9	12	26	7/8-9UNC	150	150	24.20	18.90	25.70	-
13	330.0	12	29	1-8UNC	170	170	38.20	29.40	42.90	-
13	387.4	16	32	1 1/8-8UN	190	190	54.20	41.10	64.60	-
13	450.8	16	35	1 1/4-8UN	205	205	79.80	59.20	95.70	-
13	514.4	20	35	1 1/4-8UN	210	210	107.00	80.00	125.00	-
13	571.5	20	39	1 3/8-8UN	220	220	135.00	103.00	162.00	-
13	628.6	24	39	1 3/8-8UN	230	230	168.00	123.00	205.00	-
13	685.8	24	42	1 1/2-8UN	240	250	205.00	148.00	255.00	-
13	812.8	24	48	1 3/4-8UN	265	280	300.00	223.00	388.00	-

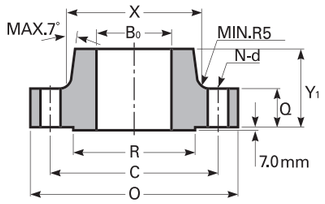
Unit : mm

Radius of Fillet	Drilling			Bolting			Approximate Weight (Kg)			
	Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Stud Bold Length		Welding Neck	Slip-On	Blind	Socket Welding
					Raised Face	Ring Joint				
r	C	N	d							
3	66.7	4	16	1/2-13UNC	75	75	0.88	0.74	0.76	0.76
3	82.6	4	19	5/8-11UNC	90	90	1.44	1.24	1.27	1.29
3	88.9	4	19	5/8-11UNC	90	90	1.81	1.51	1.59	1.58
5	98.4	4	19	5/8-11UNC	95	95	2.49	2.03	2.24	2.14
6	114.3	4	22	3/4-10UNC	110	110	3.55	3.01	3.30	3.14
8	127.0	8	19	5/8-11UNC	110	110	4.34	3.62	4.11	3.82
8	149.2	8	22	3/4-10UNC	120	120	6.41	5.20	6.20	5.57
10	168.3	8	22	3/4-10UNC	125	125	8.62	7.08	8.51	7.59
10	184.2	8	26	7/8-9UNC	140	140	10.80	8.86	10.90	-
11	215.9	8	26	7/8-9UNC	145	145	17.60	14.60	17.40	-
11	266.7	8	29	1-8UNC	165	165	29.40	24.60	29.40	-
13	292.1	12	29	1-8UNC	170	170	35.70	29.60	36.40	-
13	349.2	12	32	1 1/8-8UN	190	195	54.60	44.00	58.80	-
13	431.8	16	35	1 1/4-8UN	215	215	90.00	73.30	98.40	-
13	489.0	20	35	1 1/4-8UN	220	220	110.00	87.00	124.00	-
13	527.0	20	39	1 3/8-8UN	235	235	130.00	99.80	152.00	-
13	603.2	20	42	1 1/2-8UN	255	255	183.00	142.00	214.00	-
13	654.0	20	45	1 5/8-8UN	275	275	226.00	175.00	275.00	-
13	723.9	24	45	1 5/8-8UN	285	290	284.00	224.00	352.00	-
13	838.2	24	51	1 7/8-8UN	330	335	408.00	317.00	536.00	-

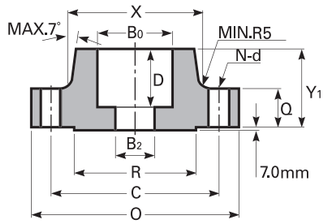
CLASS 900/1500 FLANGES



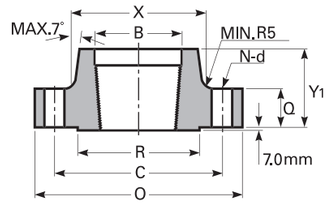
WELDING NECK



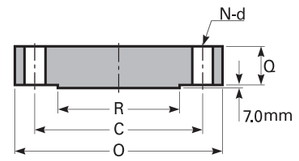
SLIP-ON



SOCKET WELDING



THREADED



BLIND

CLASS 900

Unit : mm

Nominal Pipe Size		Outside Diam.	Bore		Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thickness	Length Thru Hub		Depth of Socket
			SO, SW	WN, SW					SO, SW THRED	WN	
A	B	O	B0	B2	X	H	R	Q	Y1	Y	D
15	1/2	120	22.2	To be Specified by Purchaser.	38	21.7	34.9	22.3	32	60	10
20	3/4	130	27.7		44	27.2	42.9	25.4	35	70	11
25	1	150	34.5		52	34.0	50.8	28.6	41	73	13
(32)	(1 1/4)	160	43.2		64	42.7	63.5	28.6	41	73	14
40	1 1/2	180	49.1		70	48.6	73.0	31.8	44	83	16
50	2	215	61.1		105	60.5	92.1	38.1	57	102	17
65	2 1/2	245	77.1		124	76.3	104.8	41.3	64	105	19
80	3	240	90.0		127	89.1	127.0	38.1	54	102	-
100	4	290	115.4		159	114.3	157.2	44.5	70	114	-
(125)	(5)	350	141.2		190	139.8	185.7	50.8	79	127	-
150	6	380	166.6		235	165.2	215.9	55.6	86	140	-
200	8	470	218.0		298	216.3	269.9	63.5	102	162	-
250	10	545	269.5		368	267.4	323.8	69.9	108	184	-
300	12	610	321.0		419	318.5	381.0	79.4	117	200	-
350	14	640	358.1		451	355.6	412.8	85.8	130	213	-
400	16	705	409.0		508	406.4	469.9	88.9	133	216	-
450	18	785	460.0		565	457.2	533.4	101.6	152	229	-
500	20	855	511.0		622	508.0	584.2	108.0	159	248	-
600	24	1040	613.0		749	609.6	692.2	139.7	203	292	-

CLASS 1500

Unit : mm

Nominal Pipe Size		Outside Diam.	Bore		Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thickness	Length Thru Hub		Depth of Socket
			SO, SW	WN, SW					SO, SW THRED	WN	
A	B	O	B0	B2	X	H	R	Q	Y1	Y	D
15	1/2	120	22.2	To be Specified by Purchaser.	38	21.7	34.9	22.3	32	60	10
20	3/4	130	27.7		44	27.2	42.9	25.4	35	70	11
25	1	150	34.5		52	34.0	50.8	28.6	41	73	13
(32)	(1 1/4)	160	43.2		64	42.7	63.5	28.6	41	73	14
40	1 1/2	180	49.1		70	48.6	73.0	31.8	44	83	16
50	2	215	61.1		105	60.5	92.1	38.1	57	102	17
65	2 1/2	245	77.1		124	76.3	104.8	41.3	64	105	19
80	3	265	-		133	89.1	127.0	47.7	-	117	-
100	4	310	-		162	114.3	157.2	54.0	-	124	-
(125)	(5)	375	-		197	139.8	185.7	73.1	-	156	-
150	6	395	-		229	165.2	215.9	82.6	-	171	-
200	8	485	-		292	216.3	269.9	92.1	-	213	-
250	10	585	-		368	267.4	323.8	108.0	-	254	-
300	12	675	-		451	318.5	381.0	123.9	-	283	-
350	14	750	-		495	355.6	412.8	133.4	-	298	-
400	16	825	-		552	406.4	469.9	146.1	-	311	-
450	18	915	-		597	457.2	533.4	162.0	-	327	-
500	20	985	-		641	508.0	584.2	177.8	-	356	-
600	24	1170	-		762	609.6	692.2	203.2	-	406	-

* WN: Welding Neck *SO: Slip-On *SW: Socket Welding *LJ: Lap Joint *THRED: Threaded *BL: Blind

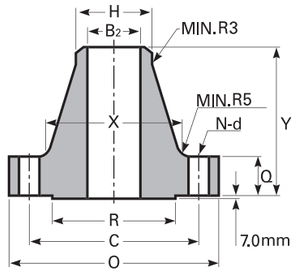
Unit : mm

Drilling			Bolting			Approximate Weight (Kg)			
Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Stud Bold Length		Welding Neck	Slip-On	Blind	Socket Welding
				Raised Face	Ring Joint				
C	N	d							
82.6	4	22	3/4-10UNC	110	110	1.89	1.76	1.79	1.81
88.9	4	22	3/4-10UNC	115	115	2.54	2.32	2.40	2.39
101.6	4	26	7/8-9UNC	125	125	3.75	3.44	3.59	3.56
111.1	4	26	7/8-9UNC	125	125	4.38	3.95	4.20	4.11
123.8	4	29	1-8UNC	140	140	6.01	5.41	5.80	5.61
165.1	8	26	7/8-9UNC	145	145	11.90	9.92	10.10	10.30
190.5	8	29	1-8UNC	160	160	14.90	13.50	14.00	14.20
190.5	8	26	7/8-9UNC	145	145	16.50	11.60	13.10	-
235.0	8	32	1 1/8-8UN	170	170	22.60	19.80	22.10	-
279.4	8	35	1 1/4-8UN	190	190	36.60	32.40	36.60	-
317.5	12	32	1 1/8-8UN	190	195	48.60	42.10	47.70	-
393.7	12	39	1 3/8-8UN	220	220	82.40	71.60	82.30	-
469.9	16	39	1 3/8-8UN	235	235	122.00	102.00	122.00	-
533.4	20	39	1 3/8-8UN	255	255	166.00	136.00	173.00	-
558.8	20	42	1 1/2-8UN	275	280	189.00	153.00	205.00	-
616.0	20	45	1 5/8-8UN	285	290	233.00	186.00	259.00	-
685.8	20	51	1 7/8-8UN	325	335	317.00	258.00	366.00	-
749.3	20	54	2-8UN	350	360	399.00	317.00	462.00	-
901.7	20	67	2 1/2-8UN	440	455	737.00	608.00	876.00	-

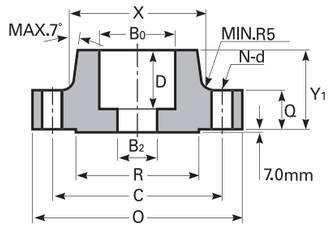
Unit : mm

Drilling			Bolting			Approximate Weight (Kg)			
Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Stud Bold Length		Welding Neck	Slip-On	Blind	Socket Welding
				Raised Face	Ring Joint				
C	N	d							
82.6	4	22	3/4-10UNC	110	110	1.89	1.76	1.79	1.81
88.9	4	22	3/4-10UNC	115	115	2.54	2.32	2.40	2.39
101.6	4	26	7/8-9UNC	125	125	3.75	3.44	3.59	3.56
111.1	4	26	7/8-9UNC	125	125	4.38	3.95	4.20	4.11
123.8	4	29	1-8UNC	140	140	6.01	5.41	5.80	5.61
165.1	8	26	7/8-9UNC	145	145	11.90	9.92	10.10	10.30
190.5	8	29	1-8UNC	160	160	14.90	13.50	14.00	14.20
203.2	8	32	1 1/8-8UN	180	180	20.10	18.10	19.30	-
241.3	8	35	1 1/4-8UN	195	195	30.30	27.80	29.90	-
292.1	8	42	1 1/8-8UN	250	250	57.60	52.60	58.70	-
317.5	12	39	1 3/8-8UN	260	265	69.40	62.10	72.00	-
393.7	12	45	1 5/8-8UN	290	300	118.00	105.00	122.00	-
482.6	12	51	1 7/8-8UN	335	345	207.00	180.00	211.00	-
571.5	16	54	2-8UN 375	385	311.00	271.00	319.00	-	
635	16	60	2 1/4-8UN	405	425	405.00	-	421.00	-
704.8	16	67	2 1/2-8UN	445	470	521.00	-	559.00	-
774.7	16	74	2 3/4-8UN	495	525	685.00	-	761.00	-
831.8	16	80	3-8UN	540	565	851.00	-	967.00	-
990.6	16	93	3 1/2-8UN	615	650	1371.00	-	1568.00	-

CLASS 2500 FLANGES



WELDING NECK



SOCKET WELDING

CLASS 2500

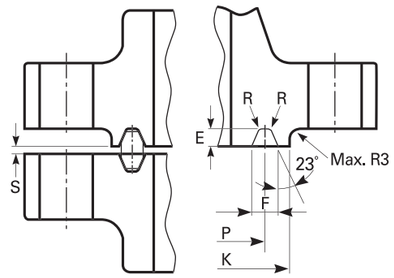
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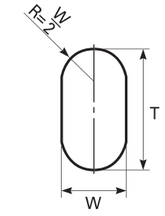
Nominal Pipe Size		Outside Diam.	Bore	Diam. at Base of Hub	Diam. of Hub at Bevel	O.D of Raised Face	Thick-ness	Length Thru Hub	Drilling			Bolting			Approximate Weight (Kg)	
			WN, SW					WN	Bolt Circle Diam.	Num. of Holes	Diam. of Holes	Diam. of Bolts	Stud Bold Length		Wel-ding Neck	Blind
													Raised Face	Ring Joint		
A	B	O	B2	X	H	R	Q	Y	C	N	d					
15	1/2	135		43	21.7	34.9	30.2	73	88.9	4	22	3/4-10UNC	120	120	3.12	2.98
20	3/4	140		51	27.2	42.9	31.8	79	95.2	4	22	3/4-10UNC	125	125	3.73	3.52
25	1	160		57	34.0	50.8	35.0	89	108.0	4	26	7/8-9UNC	140	140	5.24	4.98
(32)	(1 1/4)	185		73	42.7	63.5	38.1	95	130.2	4	29	1-8UNC	150	150	7.80	7.40
40	1 1/2	205		79	48.6	73.0	44.5	111	146.0	4	32	1 1/8-8UN	170	170	10.90	10.40
50	2	235		95	60.5	92.1	50.9	127	171.4	8	29	1-8UNC	180	180	16.30	15.60
65	2 1/2	265		114	76.3	104.8	57.2	143	196.8	8	32	1 1/8-8UN	195	205	23.80	22.80
80	3	305		133	89.1	127.0	66.7	168	228.6	8	35	1 1/4-8UN	220	230	36.50	35.00
100	4	355		165	114.3	157.2	76.2	190	273.0	8	42	1 1/2-8UN	255	260	55.80	56.00
(125)	(5)	420		203	139.8	185.7	92.1	229	323.8	8	48	1 3/4-8UN	300	310	96.30	54.10
150	6	485		235	165.2	215.9	108.0	273	368.3	8	54	2-8UN	345	355	146.00	91.00
200	8	550		305	216.3	269.9	127.0	318	438.2	12	54	2-8UN	380	395	214.00	142.00
250	10	675		375	267.4	323.8	165.1	419	539.8	12	67	2 1/2-8UN	490	510	423.00	414.00
300	12	760		441	318.5	381.0	184.2	464	619.1	12	74	2 3/4-8UN	540	560	596.00	588.00

To be Specified by Purchaser.

* WN: Welding Neck *SO: Slip-On *SW: Socket Welding *LJ: Lap Joint *THRED: Threaded *BL: Blind

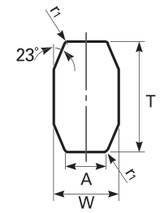
RING JOINT





Oval Ring

W≤22.2mm r1=1.5mm
W>22.2mm r1=2.0mm

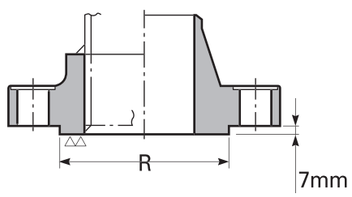


Octagonal Ring

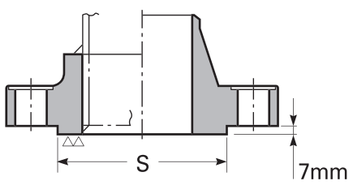
Unit : mm

Nominal Pipe Size		CLASS 150						CLASS 300, 400, 600					
		Diam. of Raised Face	Pitch Diam.	Ring Num.	Depth of Groove	Wide of Groove	Ring Groove Bottom Radious	Diam. of Raised Face	Pitch Diam.	Ring Num.	Depth of Groove	Wide of Groove	Ring Groove Bottom Radious
		K	P		E	F	R	K	P		E	F	R
15	1/2	-	-	-	-	-	-	51.0	34.14	R11	5.54	7.14	0.8
20	3/4	-	-	-	-	-	-	63.5	42.88	R13	6.35	8.74	0.8
25	1	63.5	47.63	R15	6.35	8.74	0.8	70.0	50.80	R16	6.35	8.74	0.8
32	1 1/4	73.0	57.15	R17	6.35	8.74	0.8	79.5	60.33	R18	6.35	8.74	0.8
40	1 1/2	82.5	65.07	R19	6.35	8.74	0.8	90.5	68.27	R20	6.35	8.74	0.8
50	2	102	82.55	R22	6.35	8.74	0.8	108	82.55	R23	7.92	11.91	0.8
65	2 1/2	121	101.60	R25	6.35	8.74	0.8	127	101.60	R26	7.92	11.91	0.8
80	3	133	114.30	R29	6.35	8.74	0.8	146	123.83	R31	7.92	11.91	0.8
90	3 1/2	154	131.78	R33	6.35	8.74	0.8	159	131.78	R34	7.92	11.91	0.8
100	4	171	149.23	R36	6.35	8.74	0.8	175	149.23	R37	7.92	11.91	0.8
125	5	194	171.45	R40	6.35	8.74	0.8	210	180.98	R41	7.92	11.91	0.8
150	6	219	193.68	R43	6.35	8.74	0.8	241	211.12	R45	7.92	11.91	0.8
200	8	273	247.65	R48	6.35	8.74	0.8	302	269.88	R49	7.92	11.91	0.8
250	10	330	304.80	R52	6.35	8.74	0.8	356	323.85	R53	7.92	11.91	0.8
300	12	406	381.00	R56	6.35	8.74	0.8	413	381.00	R57	7.92	11.91	0.8
350	14	425	396.88	R59	6.35	8.74	0.8	457	419.10	R61	7.92	11.91	0.8
400	16	483	454.02	R64	6.35	8.74	0.8	508	469.90	R65	7.92	11.91	0.8
450	18	546	517.53	R68	6.35	8.74	0.8	575	533.40	R69	7.92	11.91	0.8
500	20	597	558.80	R72	6.35	8.74	0.8	635	584.20	R73	9.52	13.49	1.5
600	24	711	673.10	R76	6.35	8.74	0.8	749	692.15	R77	11.13	16.66	1.5

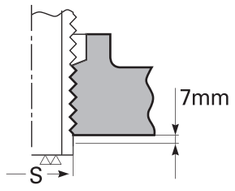
FACING DIMENSIONS & SPOT FACING

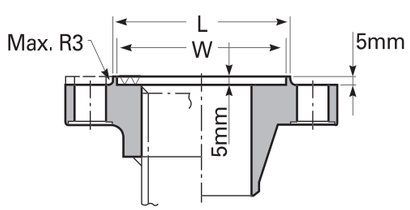


1) LARGE MALE

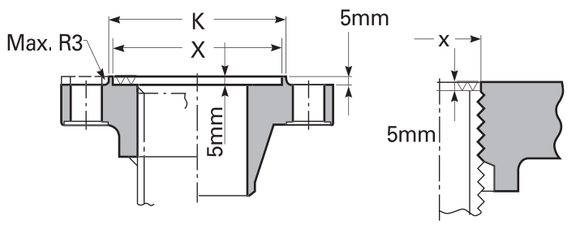


2) SMALL MALE

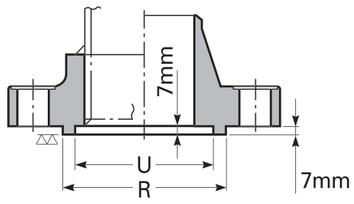




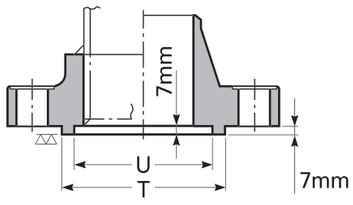
3) LARGE FEMALE



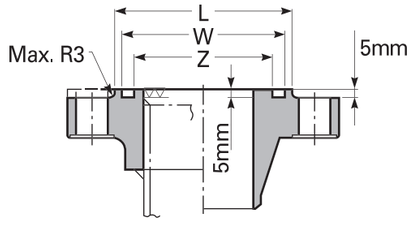
4) SMALL FEMALE



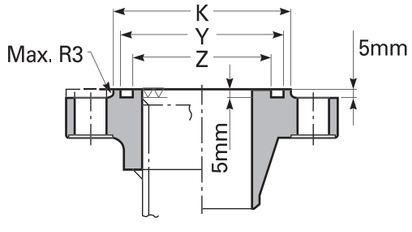
5) LARGE TONGUE



6) SMALLTONGUE



7) LARGE GROOVE



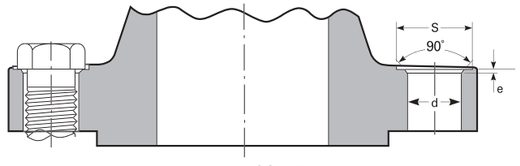
8) SMALL GROOVE

Facing Dimension Table

Unit : mm

Nominal Bore		Outside Diameter Dimension						Inside Diameter Dimension		Diameter of Outside	
		Face Large Male Large Tongue	Small Male	Small Tongue	Large Female Lagre Groove	Small Female	Small Groove	Lagre Tongue Small Tongue	Lagre Groove Small Groove	Small Female Small Groove	Large Female Lagre Groove
A	B	R	S	T	W	X	Y	U	Z	K	L
15	1/2	34.9	18.3	35.1	36.5	19.9	36.5	25.4	23.8	44	46
20	3/4	42.9	23.8	42.9	44.4	25.4	44.4	33.3	31.8	52	54
25	1	50.8	30.2	47.8	52.4	31.8	49.2	38.1	36.5	57	62
32	1 1/4	63.5	38.1	57.2	65.1	39.7	58.7	47.6	46.0	67	75
40	1 1/2	73.0	44.4	63.5	74.6	46.0	65.1	54.0	52.4	73	84
50	2	92.1	57.2	82.6	93.7	58.8	84.1	73.0	71.4	92	103
65	2 1/2	104.8	68.3	95.2	106.4	69.8	96.8	85.7	84.1	105	116
80	3	127.0	84.1	117.5	128.6	85.7	119.1	108.0	106.4	127	138
90	3 1/2	139.7	96.8	130.2	141.3	98.4	131.8	120.6	119.1	140	151
100	4	157.2	109.5	144.5	158.8	111.1	146.0	131.8	130.2	157	168
125	5	185.7	136.5	173.0	187.3	138.1	171.6	160.3	158.8	186	197
150	6	215.9	161.9	203.2	217.5	163.5	204.8	190.5	188.9	216	227
200	8	269.9	212.7	254.0	271.5	214.3	255.6	238.1	236.5	270	281
250	10	323.8	266.7	304.8	325.4	268.3	306.4	285.8	284.2	324	335
300	12	381.0	317.5	362.0	382.6	319.1	363.5	342.9	341.3	381	392
350	14	412.8	349.2	393.7	414.3	350.8	395.3	374.6	373.1	413	424
400	16	469.9	400.0	447.5	471.5	401.6	449.3	425.4	423.9	470	481
450	18	533.4	450.8	511.2	535.0	452.4	512.8	489.0	487.4	533	544
500	20	584.2	501.6	558.8	585.8	503.2	560.4	533.4	531.8	584	595
600	24	692.2	603.2	666.8	693.7	604.8	668.3	641.4	639.8	692	703

Dimensions of Spot Facing

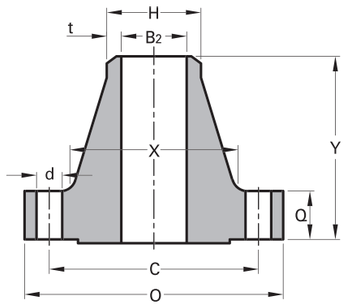


Dimensions of Spot Facing

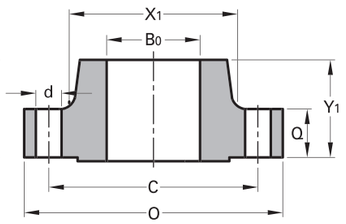
Unit : mm

Diameter of Bolt	Diameter of Bolt Hole	Diameter of Spot Facing	Champering
	d	S (Min.)	e
1/2-13UNC	16	27.5	1.1
5/8-11UNC	19	33.5	1.5
3/4-10UNC	22	40	1.5
7/8-9UNC	26	46	1.5
1-8UNC	29	52	2
1 1/8-8UN	32	57	2
1 1/4-8UN	35	62	2
1 3/8-8UN	39	68	2
1 1/2-8UN	42	73	2
1 5/8-8UN	45	80	2
1 3/4-8UN	48	84	2
1 7/8-8UN	51	89	2
2-8UN	54	96	2.5
2 1/4-8UN	60	107	2.5
2 1/2-8UN	67	118	-
2 3/4-8UN	74	129	-
3-8UN	80	140	-
3 1/2-8UN	93	162	-

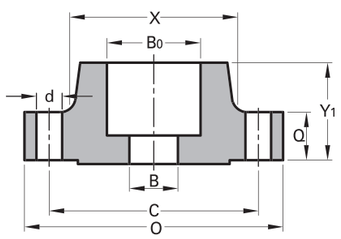
DIMENSIONAL TOLERANCE



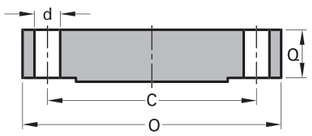
WELDING NECK



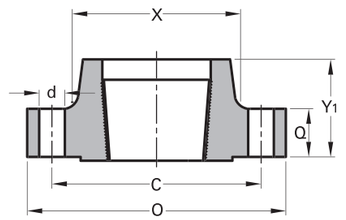
SLIP-ON



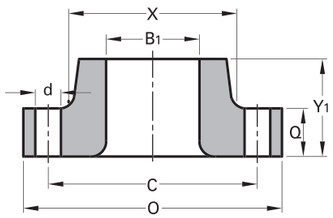
SOCKET WELDING



BLIND



THREADED

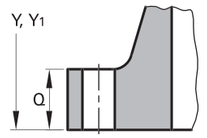


LAP JOINT

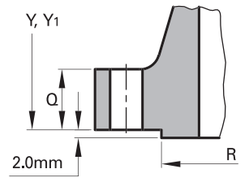
JPI-7S-15-2005

Unit : mm

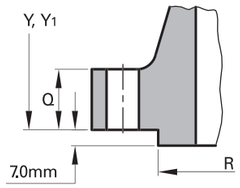
Outside Diameter	O	-	610mm or Less	±1.5
			Over 610mm	±3.0
Inside Diameter	B	Welding Neck	Nominal Bore 250A or Less	±1.0
			Nominal Bore 300A~450A	±1.5
			Nominal Bore 500A Over	+3.0 / -1.5
	B0 B1	Slip-On Lap Joint	Nominal Bore 250A or Less	+1.0 / -0
			Nominal Bore 300A Over	+1.5 / -0
	B0	Socket	Nominal Bore 15A~80A	+1.0 / -0
	B		Nominal Bore 15A~80A	±0.25
Outside Diameter of Hub	X	Welding Neck	When Hub Base is 610mm or Less	±1.5
			When Hub Base is 610mm Over	±3.0
	X1	Slip-On / Lap Joint Socket / Threaded	Nominal Bore 300A or Less	+1.5 / -1.0
			Nominal Bore 350A Over	+3.0 / -1.5
Diameter of Hub at Point of Welding	H	Welding Neck	Nominal Bore 125A or Less	+2.0 / -1.0
			Nominal Bore 150A Over	+4.0 / -1.0
Thickness	O	-	Nominal Bore 450A or Less	+3.0 / -0
			Nominal Bore 500A Over	+5.0 / -0
Length Thru Hub	Y	Welding Neck	Nominal Bore 100A or Less	±1.5
			Nominal Bore 125A~250A	+1.5 / -3.0
			Nominal Bore 300A Over	+3.0 / -5.0
	Y1	Slip-On / Socket / Threaded	Nominal Bore 450A or Less	+3.0 / -1.0
	Y2	Lap Joint	Nominal Bore 500A Over	+5.0 / -1.5
Drilling	C		Bolt Circle Diameter	±1.5
	-		Bolt Hole Spacing	±0.8
	d		Diameter of Bolt Hole	±0.5
	Execentricity of olt Code with		Respect to Bore of Flange	0.8
	Execentricity of Facing with		Nominal Bore 65A or Less	0.8
			Nominal Bore 80A Over	1.5



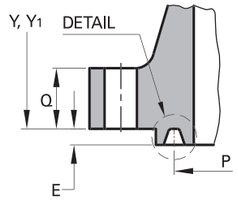
FLAT FACE



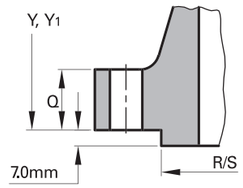
(CLASS 300 and Less)
RAISED FACE



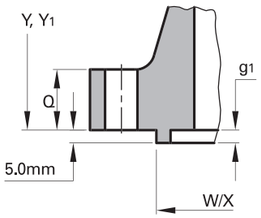
(CLASS 400 Over)
RAISED FACE



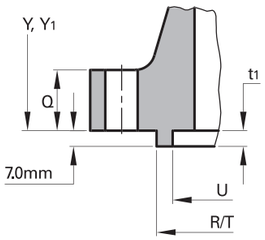
RING JOINT



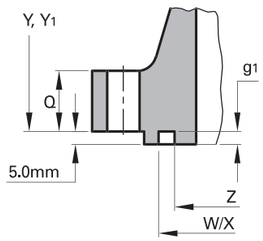
MALE



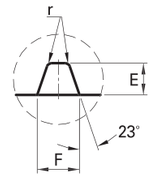
FEMALE

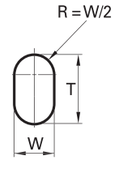


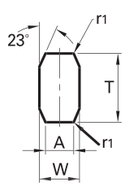
TONGUE

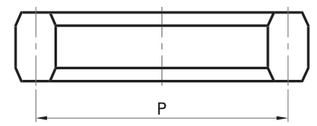


GROOVE









Diameter of Gasket	R	Raised Face	2mm	±1.0
			7mm	±0.5
		Tongue, Male		±0.5
	S, T, W, X, Y, U, Z	Male, Female, Tongue, Groove		±0.5
Depth of Gasket Face	t1	Male, Female, Tongue, Groove		+0.5 0
	g1	Male, Female, Tongue, Groove		0 -0.5
Ring Groove	E	Depth of Groove		+0.4 0
	F	Width of Groove		±0.2
	P	Pitch Diameter of Ring and Groove		±0.13
	-	Angle of Groove		±0.5°
	r	Ring Groove Buttom Diameter	r ≤ 2mm	+0.8 0
			r > 2mm	±0.8
Ring Groove	T	Height of Ring		±0.5
	W	Width of Ring		±0.20
	P	Pitch Diameter of Ring and Groove		±0.18
	A	Width of Flaton Octagonal Ring		±0.20
	-	Angle of Ring		±0.5°
	r1	Radious of Outside		±0.5

PIPE & FITTINGS WALL THICKNESS SCHEDULES DIMENSION

Nominal Pipe Size		Outside Dia.	Well	Nominal Wall Thickness (Stainless steel)							
A	B		I.D	SPP SGP	S5S	S10S	S10	S20S	S20	S30	S40S
6	1/8	10.5	W.T	-	-	1.24	-	1.50	-	-	1.73
			I.D	-	-	8.02	-	7.50	-	-	7.04
8	1/4	13.8	W.T	-	-	1.65	-	2.00	-	-	2.24
			I.D	-	-	10.50	-	9.80	-	-	9.32
10	3/8	17.3	W.T	-	-	1.65	-	2.00	-	-	2.31
			I.D	-	-	14.00	-	13.30	-	-	12.68
15	1/2	21.7	W.T	2.80	1.65	2.11	-	2.50	-	-	2.77
			I.D	16.10	18.40	17.48	-	16.70	-	-	16.16
20	3/4	27.2	W.T	2.80	1.65	2.11	-	2.50	-	-	2.87
			I.D	21.60	23.90	22.98	-	22.20	-	-	21.46
25	1	34.0	W.T	3.20	1.65	2.77	-	3.00	-	-	3.38
			I.D	27.60	30.70	28.46	-	28.00	-	-	27.24
32	1 1/4	42.7	W.T	3.50	1.65	2.77	-	3.00	-	-	3.56
			I.D	35.70	39.40	37.16	-	36.70	-	-	35.58
40	1 1/2	48.6	W.T	3.50	1.65	2.77	-	3.00	-	-	3.68
			I.D	41.60	45.30	43.06	-	42.60	-	-	41.24
50	2	60.5	W.T	3.80	1.65	2.77	-	3.50	3.20	-	3.91
			I.D	52.90	57.20	54.96	-	53.50	54.10	-	52.68
65	2 1/2	76.3	W.T	4.20	2.11	3.05	-	3.50	4.50	-	5.16
			I.D	67.90	72.08	70.20	-	69.30	67.30	-	65.98
80	3	89.1	W.T	4.20	2.11	3.05	-	4.00	4.50	-	5.49
			I.D	80.70	84.88	83.00	-	81.10	80.10	-	78.12
90	3 1/2	101.6	W.T	4.20	2.11	3.05	-	4.00	4.50	-	5.74
			I.D	93.20	97.38	95.50	-	93.60	92.60	-	90.12
100	4	114.3	W.T	4.50	2.11	3.05	-	4.00	4.90	-	6.02
			I.D	105.30	110.08	108.20	-	106.30	104.50	-	102.26
125	5	139.8	W.T	4.50	2.77	3.40	-	5.00	5.10	-	6.55
			I.D	130.80	134.26	133.00	-	129.80	129.60	-	126.70
150	6	165.2	W.T	5.00	2.77	3.40	-	5.00	5.50	-	7.11
			I.D	155.20	159.66	158.40	-	155.20	154.20	-	150.98
200	8	216.3	W.T	5.80	2.77	3.76	-	6.50	6.35	7.04	8.18
			I.D	204.70	210.76	208.78	-	203.30	203.60	202.22	199.94
250	10	267.4	W.T	6.60	3.40	4.19	-	6.50	6.35	7.80	9.27
			I.D	254.20	260.60	259.02	-	254.40	254.70	251.80	248.86
300	12	318.5	W.T	6.90	3.96	4.57	-	6.50	6.35	8.38	9.52
			I.D	304.70	310.58	309.36	-	305.50	305.80	301.74	299.46
350	14	355.6	W.T	7.90	3.96	4.78	6.35	-	7.92	9.52	9.52
			I.D	339.80	347.68	346.04	342.90	-	339.76	336.56	336.56
400	16	406.4	W.T	7.90	4.19	4.78	6.35	-	7.92	9.52	9.52
			I.D	390.60	398.02	396.84	393.70	-	390.56	387.36	387.36
450	18	457.2	W.T	7.90	4.19	4.78	6.35	-	7.92	11.12	9.52
			I.D	441.40	448.82	447.64	444.50	-	441.36	434.96	438.16
500	20	508.0	W.T	7.90	4.78	5.54	6.35	-	9.52	12.70	9.52
			I.D	492.20	498.44	496.92	495.30	-	488.96	482.60	488.96
550	22	558.8	W.T	-	4.78	5.54	6.35	-	9.52	12.70	9.52
			I.D	-	549.24	547.72	546.10	-	539.76	533.40	539.76
600	24	609.6	W.T	-	5.54	6.35	6.35	-	9.52	14.27	9.52
			I.D	-	598.52	596.90	596.90	-	590.56	581.06	590.56
650	26	660.4	W.T	-	-	7.92	7.92	-	12.70	-	9.52
			I.D	-	-	644.56	644.56	-	635.00	-	641.36
700	28	711.2	W.T	-	-	7.92	7.92	-	12.70	15.88	9.52
			I.D	-	-	695.36	695.36	-	685.80	679.44	692.16
750	30	762.0	W.T	-	6.35	7.92	7.92	-	12.70	15.88	9.52
			I.D	-	749.30	746.16	746.16	-	736.60	730.24	742.96
800	32	812.8	W.T	-	-	7.92	7.92	-	12.70	15.88	9.52
			I.D	-	-	796.96	796.96	-	787.40	781.04	793.76
850	34	863.6	W.T	-	-	7.92	7.92	-	12.70	15.88	9.52
			I.D	-	-	847.76	847.76	-	838.20	831.84	844.56
900	36	914.4	W.T	-	-	7.92	7.92	-	12.70	15.88	9.52
			I.D	-	-	898.56	898.56	-	889.00	882.64	895.36
950	38	965.2	W.T	-	-	7.92	-	-	-	-	9.52
			I.D	-	-	949.36	-	-	-	-	946.16
1000	40	1016.0	W.T	-	-	7.92	-	-	-	-	9.52
			I.D	-	-	1000.16	-	-	-	-	996.96
1050	42	1066.8	W.T	-	-	7.92	-	-	-	-	9.52
			I.D	-	-	1050.96	-	-	-	-	1047.76
1100	44	1117.6	W.T	-	-	7.92	-	-	-	-	9.52
			I.D	-	-	1101.76	-	-	-	-	1098.56
1150	46	1168.4	W.T	-	-	7.92	-	-	-	-	9.52
			I.D	-	-	1152.56	-	-	-	-	1149.36
1200	48	1219.2	W.T	-	-	7.92	-	-	-	-	9.52
			I.D	-	-	1203.36	-	-	-	-	1200.16

Nominal Wall Thickness (Carbon & Low Alloy Steel)											Outside Dia.	Nominal Pipe Size	
STD	S40	S60	S80S	XS	S80	S100	S120	S140	S160	XXS		A	B
1.73	1.73	2.20	2.41	2.41	2.41	-	-	-	3.15	4.83	10.5	6	1/8
7.04	7.04	6.10	5.68	5.68	5.68	-	-	-	4.20	0.84			
2.24	2.24	2.40	3.02	3.02	3.02	-	-	-	3.68	6.05	13.8	8	1/4
9.32	9.32	9.00	7.76	7.76	7.76	-	-	-	6.44	1.70			
2.31	2.31	2.80	3.20	3.20	3.20	-	-	-	4.01	6.40	17.3	10	3/8
12.68	12.68	11.70	10.90	10.90	10.90	-	-	-	9.28	4.50			
2.77	2.77	3.20	3.73	3.73	3.73	-	-	-	4.78	7.47	21.7	15	1/2
16.16	16.16	15.30	14.24	14.24	14.24	-	-	-	12.14	6.76			
2.87	2.87	3.40	3.91	3.91	3.91	-	-	-	5.56	7.82	27.2	20	3/4
21.46	21.46	20.40	19.38	19.38	19.38	-	-	-	16.08	11.56			
3.38	3.38	3.90	4.55	4.55	4.55	-	-	-	6.35	9.09	34.0	25	1
27.24	27.24	26.20	24.90	24.90	24.90	-	-	-	21.30	15.82			
3.56	3.56	4.50	4.85	4.85	4.85	-	-	-	6.35	9.70	42.7	32	1 1/4
35.58	35.58	33.70	33.00	33.00	33.00	-	-	-	30.00	23.30			
3.68	3.68	4.50	5.08	5.08	5.08	-	-	-	7.14	10.16	48.6	40	1 1/2
41.24	41.24	39.60	38.44	38.44	38.44	-	-	-	34.32	28.28			
3.91	3.91	4.90	5.54	5.54	5.54	-	-	-	8.74	11.07	60.5	50	2
52.68	52.68	50.70	49.42	49.42	49.42	-	-	-	43.02	38.36			
5.16	5.16	6.00	7.01	7.01	7.01	-	-	-	9.52	14.02	76.3	65	2 1/2
65.98	65.98	64.30	62.28	62.28	62.28	-	-	-	57.26	48.26			
5.49	5.49	6.60	7.62	7.62	7.62	-	-	-	11.12	15.24	89.1	80	3
78.12	78.12	75.90	73.86	73.86	73.86	-	-	-	66.86	58.62			
5.74	5.74	7.00	8.08	8.08	8.08	-	-	-	-	-	101.6	90	3 1/2
90.12	90.12	87.60	85.44	85.44	85.44	-	-	-	-	-			
6.02	6.02	7.10	8.56	8.56	8.56	-	11.12	-	13.49	17.12	114.3	100	4
102.26	102.26	100.10	97.18	97.18	97.18	-	92.06	-	87.32	80.06			
6.55	6.55	8.10	9.53	9.53	9.53	-	12.70	-	15.88	19.05	139.8	125	5
126.70	126.70	123.60	120.74	120.74	120.74	-	114.40	-	108.04	101.70			
7.11	7.11	9.30	10.97	10.97	10.97	-	14.27	-	18.26	21.94	165.2	150	6
150.98	150.98	146.60	143.26	143.26	143.26	-	136.66	-	128.68	121.32			
8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.22	216.3	200	8
199.94	199.94	195.68	190.90	190.90	190.90	186.12	179.78	175.06	170.28	171.86			
9.27	9.27	12.70	12.70	12.70	15.10	18.26	21.44	25.40	28.58	25.40	267.4	250	10
248.86	248.86	242.00	242.00	242.00	237.20	230.88	224.52	216.60	210.24	216.60			
9.52	10.31	14.27	12.70	12.70	-	21.44	25.40	28.58	33.32	25.40	318.5	300	12
299.46	297.88	289.96	293.10	293.10	-	275.62	267.70	261.34	251.86	267.70			
9.52	11.13	15.09	12.70	12.70	-	23.83	27.79	31.75	35.71	-	355.6	350	14
336.56	333.34	325.42	330.20	330.20	-	307.94	300.02	292.10	284.18	-			
9.52	12.70	16.66	12.70	12.70	-	26.19	30.96	36.52	40.49	-	406.4	400	16
387.36	381.00	373.08	381.00	381.00	-	354.02	344.48	333.36	325.42	-			
9.52	14.27	19.05	12.70	12.70	-	29.36	34.92	39.67	45.24	-	457.2	450	18
438.16	428.66	419.10	431.80	431.80	-	398.48	387.36	377.86	366.72	-			
9.52	15.09	20.62	12.70	12.70	-	32.54	38.10	44.45	50.01	-	508.0	500	20
488.96	477.82	466.76	482.60	482.60	-	442.92	431.80	419.10	407.98	-			
9.52	-	22.22	12.70	12.70	-	34.92	41.28	47.62	53.98	-	558.8	550	22
539.76	-	514.36	533.40	533.40	-	488.96	476.24	463.56	450.84	-			
9.52	17.48	24.61	12.70	12.70	-	38.89	46.02	52.37	59.54	-	609.6	600	24
590.56	574.64	560.38	584.20	584.20	-	531.82	517.56	504.86	490.52	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	660.4	650	26
641.36	-	-	635.00	635.00	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	711.2	700	28
692.16	-	-	685.80	685.80	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	762.0	750	30
742.96	-	-	736.60	736.60	-	-	-	-	-	-			
9.52	17.48	-	12.70	12.70	-	-	-	-	-	-	812.8	800	32
793.76	777.84	-	787.40	787.40	-	-	-	-	-	-			
9.52	17.48	-	12.70	12.70	-	-	-	-	-	-	863.6	850	34
844.56	828.64	-	838.20	838.20	-	-	-	-	-	-			
9.52	19.05	-	12.70	12.70	-	-	-	-	-	-	914.4	900	36
895.36	876.30	-	889.00	889.00	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	965.2	950	38
946.16	-	-	939.80	939.80	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	1016.0	1000	40
996.96	-	-	990.60	990.60	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	1066.8	1050	42
1047.76	-	-	1041.40	1041.40	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	1117.6	1100	44
1098.56	-	-	1092.20	1092.20	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	1168.4	1150	46
1149.36	-	-	1143.00	1143.00	-	-	-	-	-	-			
9.52	-	-	12.70	12.70	-	-	-	-	-	-	1219.2	1200	48
1200.16	-	-	1193.80	1193.80	-	-	-	-	-	-			

Standard finishes for contact face of Flange

I. Standard Specification

KS B 0161:1999	Surface roughness Definitions and designation
JIS B 0601:2001	Geometrical Product Specifications (GPS)-Surface texture
ASME B 46.1	Surface texture(Surface Roughness, Waviness, And Lay)
MSS SP-6	Standard Finishes For Contact Faces of Pipe Flanges And Connecting-End Flanges of Valves and Fittings.

II. TERMINOLOGY

AARH	Arithmetic Average Roughness Height
RA	Roughness Average
RMS	Root Mean Square

AAHR (Ra) µin(µm)	Rmax (S)	Angle of Tool Front edge	Raidus of Tool (mm)	Feed Speed (mm/Rev.)	Peak Count (/in)	Symbol
63 (1.6)	4.5S	45 °	1.6R	0.283	90	▽▽▽
			1.2R	0.245	104	
125 (3.2)	12.5S	45 °	1.6R	0.398	64	▽▽
			1.2R	0.345	74	
250 (6.3a)	25S	45 °	1.6R	0.563	45	
			1.2R	0.487	52	
500 (12.5)	50S	45 °	1.6R	0.796	32	▽
			1.2R	0.689	37	
1000 (25)	100S	45 °	1.6R	1.126	23	
			1.2R	0.975	26	

1) Permitted Tolerance : +15% / –20%
2) 1.6R BITE 사용하는 것을 원칙으로 한다.
3) 일반적 표면 조도에는 Ra(중심선 평균 거칠기), Rmax(최대높이) 등이 있다.
4) 현재 국제적으로는 중심선 평균 거칠기는 Ra(AARH : Arithmetic Average Roughness Hight) 로 나타낸다.
5) AARH는 MICRO–INCHES (µin)와 MICRO–METERS (µm)로 나타낸다.
6) RMS(ROOT MEAN SQUARE)은 AARH보다 약간 큰 값을 가지나 AARH와의 환산 규정은 없다.

III. ARITHMETIC AVERAGE ROUGHNESS HIGHT(Ra), Rmax = Mmax, Peak-Balley Roughness

RADIUS OF TOOL	Ra = 500µ in Rmax = 0.050mm		Ra = 250µ in Rmax = 0.025mm		Ra = 200µ in Rmax = 0.020mm		Ra = 125µ in Rmax = 0.0124mm		Ra = 63µ in Rmax = 0.0063mm	
	FEED (mm)	GROOVES PER INCH	FEED (mm)	GROOVES PER INCH	FEED (mm)	GROOVES PER INCH	FEED (mm)	GROOVES PER INCH	FEED (mm)	GROOVES PER INCH
0.5	0.44	58.20	0.31	81.40	0.28	90.70	0.22	114.90	0.16	160.80
0.6	0.48	53.00	0.34	74.30	0.31	81.90	0.24	104.50	0.17	146.80
0.7	0.52	48.90	0.37	68.60	0.33	76.90	0.26	96.00	0.19	135.80
0.8	0.56	45.70	0.40	64.10	0.36	70.50	0.29	90.40	0.20	127.00
0.9	0.59	43.00	0.42	60.50	0.38	66.80	0.30	85.20	0.21	119.80
1.0	0.62	40.80	0.44	57.50	0.40	63.50	0.31	80.90	0.22	113.60
1.1	0.65	38.80	0.47	54.60	0.42	60.50	0.33	77.20	0.23	108.50
1.2	0.68	37.10	0.49	52.40	0.44	57.70	0.34	73.80	0.25	103.70
1.3	0.71	35.70	0.51	50.30	0.45	56.40	0.36	70.90	0.26	89.60
1.4	0.74	34.40	0.53	48.40	0.47	54.00	0.37	68.30	0.26	96.20
1.5	0.77	33.20	0.54	46.80	0.49	51.80	0.39	66.00	0.27	92.70
1.6	0.79	32.10	0.56	45.20	0.50	50.80	0.40	63.80	0.28	89.80
1.7	0.82	31.10	0.58	43.90	0.52	48.80	0.41	62.00	0.29	87.30
1.8	0.84	30.20	0.60	42.10	0.53	47.90	0.42	60.20	0.30	84.70
1.9	0.86	29.40	0.61	41.50	0.55	46.10	0.43	58.70	0.31	82.50
2.0	0.89	28.70	0.63	40.40	0.56	45.30	0.45	57.00	0.32	80.40

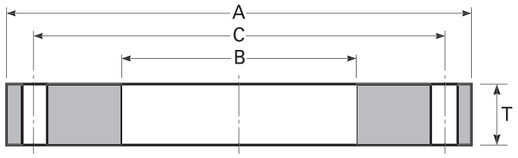
AWWA C207-01 FLANGES








CLASS B&D SO-RING



AWWA C207-01 Standard steel-ring Flanges CLASS B*(86 psi) and CLASS D†(175-150 psi)

Unit : mm

Nominal Pipe Size		Outside Diameter of Flange	Inside Diameter of Flange	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts§	Thickness of Flange	
							Class B	Class D
in.	mm	A	B‡	C			T	T
4	100	228.6	116.1	190.5	8	15.9	15.9	15.9
5	125	254.0	143.8	215.9	8	19.1	15.9	15.9
6	150	279.4	170.7	241.3	8	19.1	17.5	17.5
8	200	342.9	221.5	298.5	8	19.1	17.5	17.5
10	250	406.4	276.4	362.0	12	22.2	17.5	17.5
12	300	482.6	327.2	431.8	12	22.2	17.5	20.6
14	350	533.4	360.4	476.3	12	25.4	17.5	23.8
16	400	596.9	411.2	539.8	16	25.4	17.5	25.4
18	450	635.0	462.0	577.9	16	28.6	17.5	27.0
20	500	698.5	512.8	635.0	20	28.6	17.5	28.6
22	550	749.3	563.6	692.2	20	31.8	19.1	30.2
24	600	812.8	614.4	749.3	20	31.8	19.1	31.8
26	650	870.0	-	806.5	24	31.8	20.6	33.3
28	700	927.1	-	863.6	28	31.8	22.2	33.3
30	750	984.3	-	914.4	28	31.8	22.2	34.9
32	800	1060.5	-	977.9	28	38.1	23.8	38.1
34	850	1111.3	-	1028.7	32	38.1	23.8	38.1
36	900	1168.4	-	1085.9	32	38.1	25.4	41.3
38	950	1238.3	-	1149.4	32	38.1	25.4	41.3
40	1000	1289.1	-	1200.2	36	38.1	25.4	41.3
42	1050	1346.2	-	1257.3	36	38.1	28.6	44.5
44	1100	1403.4	-	1314.5	40	38.1	28.6	44.5
46	1150	1454.2	-	1365.3	40	38.1	28.6	44.5
48	1200	1511.3	-	1422.4	44	38.1	31.8	47.6
50	1250	1568.5	-	1479.6	44	44.5	31.8	50.8
52	1300	1625.6	-	1536.7	44	44.5	31.8	50.8
54	1350	1682.8	-	1593.9	44	44.5	34.9	54.0
60	1500	1854.2	-	1759.0	52	44.5	38.1	57.2
66	1650	2032.0	-	1930.4	52	44.5	41.3	63.5
72	1800	2197.1	-	2095.5	60	44.5	44.5	66.7
78	1950	2362.2	-	2260.6	64	50.8	50.8	69.9
84	2100	2533.7	-	2425.7	64	50.8	50.8	73.0
90	2250	2705.1	-	2590.8	68	57.2	57.2	76.2
96	2400	2876.6	-	2755.9	68	57.2	57.2	82.6
102	2550	3048.0	-	2908.3	72	63.5	63.5	82.6
108	2700	3219.5	-	3067.1	72	63.5	63.5	85.7
114	2850	3390.9	-	3219.5	76	69.9	69.9	88.9
120	3000	3562.4	-	3371.9	76	69.9	69.9	88.9
126	3150	3733.8	-	3537.0	80	76.2	76.2	95.3
132	3300	3905.3	-	3702.1	80	76.2	76.2	98.4
138	3450	4076.7	-	3860.8	84	82.6	82.6	101.6
144	3600	4248.2	-	4019.6	84	82.6	82.6	104.8

Notes :

1. Ring flanges may be overbored or counterbored to accommodate larger outside-diameter pipe than shown as nominal. This is done to allow a clear inside diameter after cement-mortar lining. Wrench clearance between the pipe OD and bolt circle must be maintained as well as sufficient gasket seating area.
2. Metric conversion: nominal pipe size: in. x 25 = mm; dimensions: in. x 25.4 = mm; psi x 6.895 = kPa

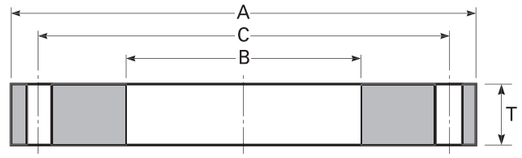
* Pressure rating at atmospheric temperature is 86 psi. These flanges have the same OD and drilling as class 125 cast-iron flanges (ASMEí ASME B16.1). In sizes 24 in. and smaller, they also match ANSI/ASME B16.5 150 psi drilling for steel flanges.

† Pressure rating at atmospheric temperature: sizes 4-12 in. inclusive, 175 psi; sizes larger than 12 in., 150 psi. These flanges have the same diameter and drilling as class 125 cast-iron flanges (ANSI/ASME B16.1). In sizes 24 in. and smaller, they also match ANSI/ASME B16.5 150-psi standard for steel flanges.

‡ The purchaser shall specify the ID of the flange, dimension B, for nominal pipe sizes 26 in. and larger. The diameter of the flange bore shall not exceed the pipe OD by more than 0.19 in.

§ Bolt holes shall be drilled 1/8 in. larger in diameter than the nominal diameter of the bolt except as stated in Sec. 4.2.3.

CLASS E&F SO-RING



AWWA C207-01 Standard steel-ring Flanges CLASS E*(275 psi) & CLASS F**(300 psi)

Unit : mm

Nominal Pipe Size		Outside Diameter of Flange		Inside Diameter of Flange		Diameter of Bolt Circle		Num. of Bolts		Diameter of Bolts‡		Thickness of Flange (T)	
		A		B†	B	C						T	
in	mm	CLASS E	CLASS F	CLASS E	CLASS F	CLASS E	CLASS F	CLASS E	CLASS F	CLASS E	CLASS F	CLASS E	CLASS F
4	100	228.6	254.0	116.1	116.1	190.5	200.2	8	8	15.9	19.1	28.6	28.7
5	125	254.0	279.4	143.8	143.8	215.9	235.0	8	8	19.1	19.1	30.2	30.7
6	150	279.4	317.5	170.7	170.9	241.3	269.7	8	12	19.1	19.1	33.4	33.3
8	200	342.9	381.0	221.5	221.7	298.5	330.2	8	12	19.1	22.2	38.1	33.3
10	250	406.4	444.5	276.4	276.4	362.0	387.4	12	16	22.2	25.4	39.7	38.1
12	300	482.6	520.7	327.2	327.2	431.8	450.9	12	16	22.2	28.6	44.5	41.4
14	350	533.4	584.2	360.4	360.4	476.3	514.4	12	20	25.4	28.6	47.6	49.3
16	400	596.9	647.7	411.2	411.2	539.8	571.5	16	20	25.4	31.8	50.8	54.4
18	450	635.0	711.2	462.0	462.0	577.9	628.7	16	24	28.6	31.8	54.0	57.2
20	500	698.5	774.7	512.8	512.8	635.0	685.8	20	24	28.6	31.8	60.3	59.2
22	550	749.3	838.2	563.6	563.6	692.2	743.0	20	24	31.8	31.8	63.5	63.5
24	600	812.8	914.4	614.4	614.4	749.3	812.8	20	24	31.8	38.1	66.7	68.3
26	650	870.0	971.6		666.8	806.5	876.3	24	28	31.8	44.5	69.9	76.2
28	700	927.1	1035.1		717.6	863.6	939.8	28	28	31.8	44.5	69.9	79.5
30	750	984.3	1092.2		768.4	914.4	997.0	28	28	31.8	44.5	73.0	80.0
32	800	1060.5	1149.4		819.2	977.9	1054.1	28	28	38.1	44.5	76.2	82.6
34	850	1111.3	1206.5		870.0	1028.7	1104.9	32	28	38.1	44.5	76.2	85.9
36	900	1168.4	1270.0		920.8	1085.9	1168.4	32	32	38.1	50.8	79.4	87.9
38	950	1238.3	1327.2		971.6	1149.4	1219.2	32	32	38.1	50.8	79.4	88.9
40	1000	1289.1	1378.0		1022.4	1200.2	1276.4	36	36	38.1	50.8	82.6	92.2
42	1050	1346.2	1447.8		1073.2	1257.3	1339.9	36	36	38.1	50.8	85.7	96.8
44	1100	1403.4	1505.0		1124.0	1314.5	1397.0	40	36	38.1	50.8	85.7	101.6
46	1150	1454.2	1562.1		1174.8	1365.3	1454.2	40	40	38.1	50.8	87.3	104.9
48	1200	1511.3	1651.0		1225.6	1422.4	1543.1	44	40	38.1	50.8	88.9	114.3
50	1250	1568.5				1479.6		44		44.5		88.9	
52	1300	1625.6				1536.7		44		44.5		92.1	
54	1350	1682.8				1593.9		44		44.5		95.3	
60	1500	1854.2				1759.0		52		44.5		98.4	
66	1650	2032.0				1930.4		52		44.5		108.0	
72	1800	2197.1				2095.5		60		44.5		111.1	
78	1950	2362.2				2260.6		64		50.8		120.7	
84	2100	2533.7				2425.7		64		50.8		120.7	
90	2250	2705.1				2590.8		68		57.2		130.2	
96	2400	2876.6				2755.9		68		57.2		130.2	
102	2550	3048.0				2908.3		72		63.5		139.7	
108	2700	3219.5				3067.1		72		63.5		139.7	
114	2850	3390.9				3219.5		76		69.9		149.2	
120	3000	3562.4				3371.9		76		69.9		149.2	
126	3150	3733.8				3537.0		80		76.2		158.8	
132	3300	3905.3				3702.1		80		76.2		158.8	
138	3450	4076.7				3860.8		84		82.6		171.5	
144	3600	4248.2				4019.6		84		82.6		171.5	

Notes :

1. Ring flanges may be overbored or counterbored to accommodate larger outside-diameter pipe than shown as nominal. This is done to allow a clear inside diameter after cement-mortar lining. Wrench clearance between the pipe OD and bolt circle must be maintained as well as sufficient gasket seating area.
2. Metric conversion: nominal pipe size: in. x 25 = mm; dimensions: in. x 25.4 = mm; psi x 6.895 = kPa

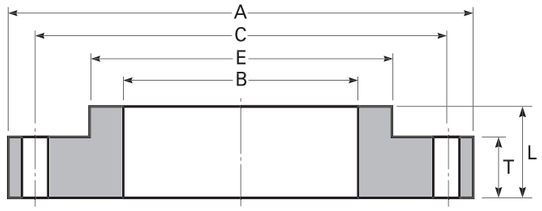
* Pressure rating at atmospheric temperature is 86 psi. These flanges have the same OD and drilling as class 125 cast-iron flanges (ASMEí ASME B16.1). In sizes 24 in. and smaller, they also match ANSI/ASME B16.5 150 psi drilling for steel flanges.

† Pressure rating at atmospheric temperature: sizes 4-12 in. inclusive, 175 psi; sizes larger than 12 in., 150 psi. These flanges have the same diameter and drilling as class 125 cast-iron flanges (ANSI/ASME B16.1). In sizes 24 in. and smaller, they also match ANSI/ASME B16.5 150-psi standard for steel flanges.

‡ The purchaser shall specify the ID of the flange, dimension B, for nominal pipe sizes 26 in. and larger. The diameter of the flange bore shall not exceed the pipe OD by more than 0.19 in.

§ Bolt holes shall be drilled 1/8 in. larger in diameter than the nominal diameter of the bolt except as stated in Sec. 4.2.3.

CLASS D&E SO-HUB



AWWA C207-01 Standard steel-Hub Flanges CLASS D*(175-150 psi) & CLASS E**(275 psi)

Unit : mm

Nominal Pipe Size		Outside Diameter of Flange	Inside Diameter of Flange	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts§	Flange Dimensions					
							CLASS D			CLASS E		
in.	mm	A	B‡	C			T	L	H	T§	L	H
4	100	228.6	116.1	190.5	8	15.9	12.7	22.2	134.9	23.8	33.3	134.9
5	125	254.0	143.8	215.9	8	19.1	14.3	31.8	160.3	23.8	36.5	163.5
6	150	279.4	170.7	241.3	8	19.1	14.3	31.8	192.1	25.4	39.7	192.1
8	200	342.9	221.5	298.5	8	19.1	14.3	31.8	246.1	28.6	44.5	246.1
10	250	406.4	276.4	362.0	12	22.2	17.5	31.8	304.8	30.2	49.2	304.8
12	300	482.6	327.2	431.8	12	22.2	17.5	31.8	365.1	31.8	55.6	365.1
14	350	533.4	360.4	476.3	12	25.4	19.1	31.8	400.1	34.9	57.2	400.1
16	400	596.9	411.2	539.8	16	25.4	19.1	31.8	457.2	36.5	63.5	457.2
18	450	635.0	462.0	577.9	16	28.6	19.1	31.8	504.8	39.7	68.3	504.8
20	500	698.5	512.8	635.0	20	28.6	19.1	31.8	558.8	42.9	73.0	558.8
22	550	749.3	563.6	692.2	20	31.8	25.4	44.5	616.0	46.0	79.4	609.6
24	600	812.8	614.4	749.3	20	31.8	25.4	44.5	663.6	47.6	82.6	663.6
26	650	870.0	665.2	806.5	24	31.8	25.4	44.5	723.9	50.8	85.7	723.9
28	700	927.1	716.0	863.6	28	31.8	25.4	44.5	774.7	52.4	87.3	781.1
30	750	984.3	766.8	914.4	28	31.8	25.4	44.5	825.5	54.0	88.9	831.9
32	800	1060.5	817.6	977.9	28	38.1	28.6	44.5	882.7	57.2	92.1	889.0
34	850	1111.3	868.4	1028.7	32	38.1	28.6	44.5	933.5	58.7	93.7	939.8
36	900	1168.4	919.2	1085.9	32	38.1	28.6	44.5	984.3	60.3	95.3	997.0
38	950	1238.3	970.0	1149.4	32	38.1	28.6	44.5	1035.1	60.3	95.3	1060.5
40	1000	1289.1	1020.8	1200.2	36	38.1	28.6	44.5	1092.2	63.5	98.4	1111.3
42	1050	1346.2	1071.6	1257.3	36	38.1	31.8	44.5	1143.0	66.7	101.6	1168.4
44	1100	1403.4	1122.4	1314.5	40	38.1	31.8	57.2	1193.8	66.7	101.6	1219.2
46	1150	1454.2	1173.2	1365.3	40	38.1	31.8	57.2	1244.6	68.3	103.2	1270.0
48	1200	1511.3	1224.0	1422.4	44	38.1	34.9	63.5	1295.4	69.9	104.8	1327.2
50	1250	1568.5	1274.8	1479.6	44	44.5	34.9	63.5	1346.2	69.9	104.8	1378.0
52	1300	1625.6	1325.6	1536.7	44	44.5	34.9	63.5	1397.0	73.0	108.0	1435.1
54	1350	1682.8	1376.4	1593.9	44	44.5	34.9	63.5	1447.8	76.2	111.1	1492.3
60	1500	1854.2	1528.8	1759.0	52	44.5	38.1	69.9	1600.2	79.4	114.3	1657.4
66	1650	2032.0	1681.2	1930.4	52	44.5	38.1	69.9	1752.6	85.7	123.8	1816.1
72	1800	2197.1	1833.6	2095.5	60	44.5	38.1	69.9	1905.0	88.9	127.0	1993.9
78	1950	2362.2	1986.0	2260.6	64	50.8	44.5	76.2	2063.8	98.4	136.5	2146.3
84	2100	2533.7	2138.4	2425.7	64	50.8	44.5	76.2	2222.5	98.4	136.5	2298.7
90	2250	2705.1	2290.8	2590.8	68	57.2	50.8	82.6	2381.3	108.0	146.1	2457.5
96	2400	2876.6	2443.2	2755.9	68	57.2	50.8	82.6	2540.0	108.0	146.1	2609.9

Notes :

1. Hub flanges are to be used on pipe that has an OD equal to the nominal pipe size in the first column and shall not be overbored.
2. Metric conversion: nominal pipe size: in. x 25 = mm; dimensions: in. x 25.4 = mm; psi x 6.895 = kPa.

* Pressure rating at atmospheric temperature: sizes 4-12 in. inclusive, 175 psi; sizes larger than 12 in., 150 psi. These flanges have the diameter and drilling as class 125 cast-iron flanges (ANSI/ASME B16.1). In sizes 24 in. and smaller, they also match ANSI/ASME B16.5 150-psi standard for steel flanges.

** Pressure rating at atmospheric temperature is 275 psi. These flanges have the same diameter and drilling as ASME B16.1, class 125 castiron flanges. In sizes 24 in. and smaller, they also match ASME B16.5, 150 psi standard for steel flanges.

† Bolt holes shall be drilled 1/8in. larger in diameter than the nominal diameter of the bolt as stated in Sec. 4.2.3.

‡ Welding neck flanges may be used if desired, at the purchaser's option. (Class E)

§ The thickness T of a flange from which the raised face has been removed, shall be no less than Dimension T minus 0.06 in.

BLIND THICKNESS

AWWA C207-01 BLIND FLANGE THICKNESS

Unit : mm

Nominal Pipe Size		Mating Flange ID	Minimum Thickness*			
			Class B	Class D†	Class E	Class F
in	mm		86psi	175-150psi	275psi	300psi
4	100	116	15.88	15.88	28.58	28.70
5	125	144	15.88	16.51	30.18	30.73
6	150	171	17.48	17.59	33.35	33.27
8	200	221	17.48	20.62	38.10	33.27
10	250	276	17.48	24.21	39.70	38.10
12	300	327	18.26	28.37	44.45	41.40
14	350	360	20.10	28.78	47.63	49.28
16	400	411	22.66	32.13	50.80	54.36
18	450	462	24.13	33.81	53.98	57.15
20	500	513	26.42	36.77	60.33	59.18
22	550	564	28.74	39.83	63.50	63.50
24	600	648	30.89	42.18	66.68	68.53
26	650	699	33.20	45.37	69.85	76.20
28	700	749	35.50	48.40	69.85	79.50
30	750	800	37.53	51.00	73.03	80.42
32	800	851	40.16	54.60	76.20	84.62
34	850	902	42.19	57.21	77.46	88.25
36	900	956	44.48	60.20	81.51	93.25
38	950	1006	47.06	63.66	86.20	96.90
40	1000	1057	49.09	66.28	89.74	101.40
42	1050	1108	51.40	69.32	93.86	105.92
44	1100	1159	53.70	72.36	97.97	110.19
46	1150	1210	55.73	74.99	101.53	114.43
48	1200	1260	58.03	78.03	105.65	121.44
50	1250	1314	60.38	81.17	109.90	
52	1300	1365	62.69	84.21	114.02	
54	1350	1416	64.99	87.25	118.14	
60	1500	1568	71.63	95.97	129.95	
66	1650	1724	78.53	105.06	142.26	
72	1800	1876	85.17	113.80	154.08	

Notes :

1. All flanges are flat faced.
2. ASTM A-36 steel used (allowable stress 16,000 psi).
3. ASTM A-307 Grade B bolts (7,000 psi allowable stress) used for class B and D.
4. ASTM A-193 Grade B7 bolts (25,000 psi allowable stress) used for class E and F.
5. For diameters over 48 in. , designers should consider using dished heads welded to a standard flange.

* Design Method: ASME Boiler & Pressure Vessel Code, Sec. VIII, Div. 1.

† Class D flanges are rated at 175 psi (1,207 kPa) for nominal pipe size ≤ 12 in. (600 mm), and 150 psi (1,034 kPa) for norminal pipe size 12 in. (600 mm)

SPECIFICATIONS

AWWA C207-01 SPECIFICATIONS

Steel pipe Flanges for Waterworks Service-Size 4 in. Through 144 in. (100mm through 3,600mm)
- Revision of ANSI/AWWA C207-97

I. Material

1. Flanges. Flanges shall be made from seamless forgings, cut from plate as a single piece, welded bar rings, or segmented and welded plates.

1.1 Forgings. Forgings shall meet the minimum requirements of ASTM A105 or A181.

1.2 Steel plate or bar. Steel plate or bar used in the manufacture of flanges shall meet the following requirements:

1. Tensile strength = 50,000 psi (345 MPa) (min).
2. Yield strength = 32,000 psi (221 MPa) (min).
3. Carbon (max) = 0.29 percent.
4. Phosphorous (max) = 0.04 percent.
5. Sulfur (max) = 0.05 percent.

The following plate designations will meet the previously listed requirements:

① ASTM A36.

② ASTM A516, grade 60, 65, or 70.

II. TOLERANCES

The dimensions listed in Tables 2 through 7 (following Sec. 6.1)
shall apply prior to attachment and are subject to the following tolerances:

2.1 Inside diameter of flange	+ l/16 in. (1.6 mm), -0
2.2 Outside diameter of flange	± 1/8 in. (3.2 mm)
2.3 Thickness of flanges 18 in. (450 mm) and smaller	+ 1/8 in. (3.2 mm), -0
2.4 Thickness of flanges 20 in. (500 mm) and larger	+ 3/16 in. (4.8 mm), -0
2.5 Length through hub 18 in. (450 mm) and smaller	+ 1/8 in. (3.2 mm)
	- 1/32 in. (0.79 mm)
2.6 Length through hub 20 in. (500 mm) and larger	+ 3/16 in. (4.8 mm),
	- 1/16 in. (1.6 mm)
2.7 Bolt-circle diameter	±1/16 in. (1.6 mm)
2.8 Bolt-hole spacing	± 1/32 in. (0.79 mm)

III. FACING

Flanges of all classes shall be flat faced-that is, without projection or raised face.
Either a serrated concentric or serrated spiral finish having from 24 groovedin.
to 40 groovedin. (0.94 to 1.57 grooveslmm) shall be used.
The cutting tool employed shall have an approximate 0.06 in. (1.52 mm) or larger radius.
The resultant surface finish shall have a 250- to 500-pin. (6.35- to 12.7-pm) roughness.

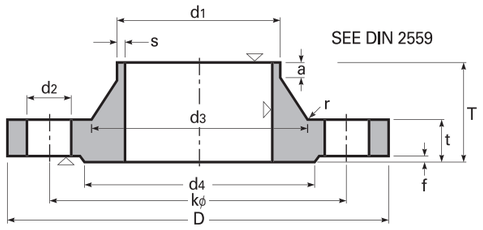
DIN FLANGES



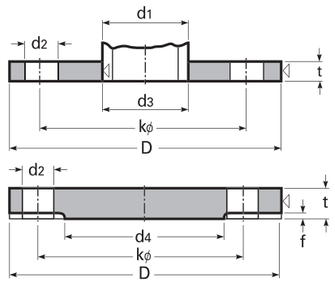





DIN 6BAR



WELDING NECK



BLIND

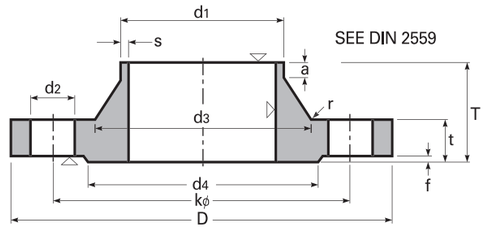
DIN 2573 SLIP - ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2631 WELDING NECK FLANGES

Unit : mm

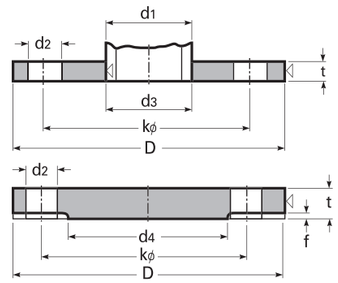
Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
			t																
Nominal Bore	d1	D	Welding Neck	Slip-on	Blind	kØ	T	d3	s	r	a	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2573	DIN 2631
10	14 17.2*)	75	12	12	12	50	28	22 26	1.8	4	6	35	2	4	M10	-	11.5	0.036	0.325
15	20 21.3*)	80	12	12	12	55	30	28 30	2	4	6	40	2	4	M10	-	11.5	0.41	0.392
20	25 26.9*)	90	14	14	14	65	32	35 38	2.3	4	6	50	2	4	M10	-	11.5	0.6	0.592
25	30 33.7*)	100	14	14	14	75	35	40 42	2.6	4	6	60	2	4	M10	-	11.5	0.74	0.747
32	38 42.4*)	120	14	16	14	90	35	50 55	2.6	6	6	70	2	4	M12	(1/2")	14	1.19	1.05
40	44.5 48.3*)	130	14	16	14	10	38	58 62	2.6	6	7	80	3	4	M12	(1/2")	14	1.39	1.18
50	57 60.3*)	140	14	16	14	110	38	70 74	2.9	6	8	90	3	4	M12	(1/2")	14	1.53	1.34
65	76.1*)	160	14	16	14	130	38	88	2.9	6	9	110	3	4	M12	(1/2")	14	1.89	1.67
80	88.9*)	190	16	18	16	150	42	102	3.2	8	10	128	3	4	M16	(5/8")	18	2.98	2.71
100	108 114.3*)	210	16	18	16	170	45	122 130	3.6	8	10	148	3	4	M16	(5/8")	18	3.46	3.24
125	133 139.7*)	240	18	20	18	200	48	148 155	4	8	10	178	3	8	M16	(5/8")	18	4.6	4.49
150	159 168.3*)	265	18	20	18	225	48	172 184	4.5	10	12	202	3	8	M16	(5/8")	18	5.22	5.15
200	216 219.1*)	320	20	22	20	280	55	230 236	5.9	10	15	258	3	8	M16	(5/8")	18	7.15	7.78
250	267 273*)	375	22	24	22	335	60	282 290	6.2	12	15	312	3	12	M16	(5/8")	18	9.61	10.8
300	318	440	22	24	22	395	62	335 342	7.1	12	15	365	4	12	M20	(3/4")	23	12.6	14
350	355.6*) 368	490	22	26	22	445	62	385	7.1	12	15	415	4	12	M20	(3/4")	23	15.6	16.1
400	406.4*) 419	540	22	28	22	495	65	438	7.1	12	15	455	4	16	M20	(3/4")	23	18.4	18.3
500	508*) 521	645	24	30	24	600	68	538	7.1	12	15	570	4	20	M20	(3/4")	23	24.5	24.6
600	609.6*) 622	755	24	-	-	705	70	640	7.1	12	16	670	5	20	M24	(7/8")	27	-	-
700	711.2*) 720	860	24	-	-	810	70	740	7.1	12	16	775	5	24	M24	(7/8")	27	-	-
800	812.8*) 820	975	24	-	-	920	70	842	7.1	12	16	880	5	24	M27	(1")	30	-	-
900	914.4*) 920	1075	26	-	-	1020	70	942	7.1	12	16	980	5	24	M27	(1")	30	-	-
1000	1016*) 1020	1175	26	-	-	1120	70	1045	7.1	16	16	1080	5	28	M27	(1")	30	-	-

*Dimensions are only used in Germany

DIN 10BAR



WELDING NECK



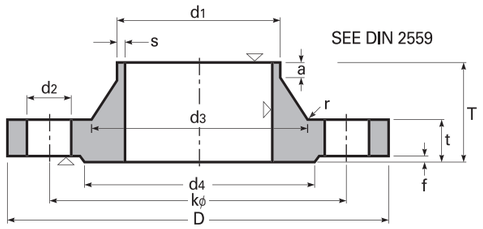
BLIND

DIN 2576 SLIP - ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2632 WELDING NECK FLANGES

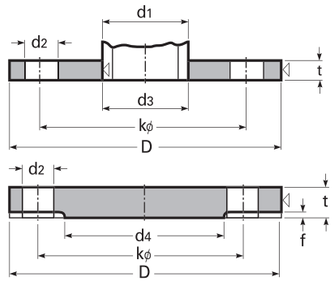
Unit : mm

Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
			t																
Nominal Bore	d1	D	Welding Neck	Slip-on	Blind	k	T	d3	s	r	a	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2573	DIN 2631
10	14 17.2*)	90	14	14	14	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.163	0.58
15	20 21.3*)	95	14	14	14	65	35	30 32	2	4	6	45	2	4	M12	(1/2")	14	0.675	0.648
20	25 26.9*)	105	16	16	16	75	38	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	0.947	0.952
25	30 33.7*)	115	16	16	16	85	38	42 45	2.6	4	6	68	2	4	M12	(1/2")	14	1.14	1.14
32	38 42.4*)	140	16	16	16	100	40	56 60	2.6	6	6	78	2	4	M16	(5/8")	18	1.66	1.69
40	44.5 48.3*)	150	16	16	16	110	42	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	1.89	1.86
50	57 60.3*)	165	18	18	18	125	45	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	2.51	2.53
65	76.1*)	185	18	18	18	145	45	90	2.9	6	10	122	3	4	M16	(5/8")	18	3	3.06
80	88.9*)	200	20	20	20	160	50	105	3.2	8	10	138	3	4	M16	(5/8")	18	3.79	3.7
100	108 114.3*)	220	20	20	20	180	52	125 131	3.6	8	12	158	3	8	M16	(5/8")	18	4.2	4.62
125	133 139.7*)	250	22	22	22	210	55	150 156	4	8	12	188	3	8	M16	(5/8")	18	5.71	6.3
150	159 168.3*)	285	22	22	22	240	55	175 184	4.5	10	12	212	3	8	M20	(3/4")	23	6.72	7.75
200	216 219.1*)	340	24	24	24	295	62	232 235	5.9	10	16	268	3	8	M20	(3/4")	23	9.5	11.3
250	267 273*)	395	26	26	26	350	68	285 292	6.3	12	16	320	3	12	M20	(3/4")	23	12.5	14.7
300	318	445	26	26	28	400	68	335 344	7.1	12	16	370	4	12	M20	(3/4")	23	14.4	17.6
350	355.6*) 368	505	26	28	30	460	68	385	7.1	12	16	430	4	16	M20	(3/4")	23	20.6	21.4
400	406.4*) 419	565	26	32	32	515	72	440	7.1	12	16	482	4	16	M24	(7/8")	27	27.9	26.1
500	508*) 521	670	28	38	34	620	75	542	7.1	12	16	585	4	20	M24	(7/8")	27	41.1	34.7
600	609.6*) 622	780	28	-	-	725	80	642	7.1	12	18	685	5	20	M27	(1")	30	-	-
700	711.2*) 720	895	30	-	-	840	80	745	8	12	18	800	5	24	M27	(1")	30	-	-
800	812.8*) 820	1015	32	-	-	950	90	850	8	12	18	905	5	24	M30	(1 1/8")	33	-	-
900	914.4*) 920	1115	34	-	-	1050	95	950	10	12	20	1005	5	28	M30	(1 1/8")	33	-	-
1000	1016*) 1020	1230	34	-	-	1160	95	1052	10	16	20	1110	5	28	M33	(1 1/8")	36	-	-

DIN 16BAR



WELDING NECK



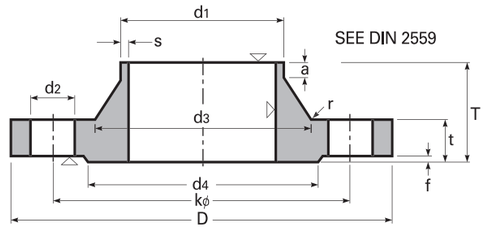
BLIND

DIN 2543 SLIP - ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2633 WELDING NECK FLANGES

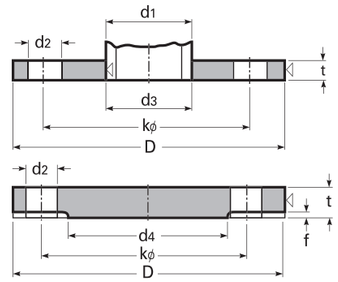
Unit : mm

Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
			t																
Nominal Bore	d1	D	Welding Neck	Slip-on	Blind	k	T	d3	s	r	a	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2573	DIN 2631
10	14 17.2*)	90	14	14	14	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.63	0.58
15	20 21.3*)	95	14	14	14	65	35	30 32	2	4	6	45	2	4	M12	(1/2")	14	0.72	0.648
20	25 26.9*)	105	16	16	16	75	38	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	1.01	0.952
25	30 33.7*)	115	16	16	16	85	38	42 45	2.6	4	6	68	2	4	M12	(1/2")	14	1.23	1.14
32	38 42.4*)	140	16	16	16	100	40	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	1.8	1.69
40	44.5 48.3*)	150	16	16	16	110	42	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.09	1.86
50	57 60.3*)	165	18	18	18	125	45	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	2.88	2.53
65	76.1*)	185	18	18	18	145	45	90	2.9	6	10	122	3	4	M16	(5/8")	18	3.66	3.06
80	88.9*)	200	20	20	20	160	50	105	2.2	8	10	138	3	8	M16	(5/8")	18	4.77	3.7
100	108 114.3*)	220	20	20	20	180	52	125 131	3.6	8	12	158	3	8	M16	(5/8")	18	5.65	4.62
125	133 139.7*)	250	22	22	22	210	55	150 156	4	8	12	188	3	8	M16	(5/8")	18	8.42	6.3
150	159 168.3*)	285	22	22	22	240	55	175 184	4.5	10	12	212	3	8	M20	(3/4")	23	10.4	7.75
200	216 219.1*)	340	24	24	24	295	62	232 235	5.9	10	16	268	3	12	M20	(3/4")	23	16.1	11
250	267 273*)	405	26	26	26	355	70	285 292	6.3	12	16	320	3	12	M24	(7/8")	27	24.9	15.6
300	318	460	28	28	28	410	78	338 344	7.1	12	16	378	4	12	M24	(7/8")	27	35.1	22
350	355.6*) 368	520	30	30	30	470	82	390	8	12	16	438	4	16	M24	(7/8")	27	47.8	28.7
400	406.4*) 419	580	32	32	32	525	85	445	8	12	16	490	4	16	M27	(1")	30	63.5	36.3
500	508*) 521	715	34	36	34	650	90	548	8	12	16	610	4	20	M30	(1 1/8")	33	102	59.3
600	609.6*) 622	840	36	40	-	770	95	652	8.8	12	18	725	5	20	M33	(1 1/4")	36	-	-
700	711.2*) 720	910	36	-	-	840	100	755	8.8	12	18	795	5	24	M33	(1 1/4")	36	-	-
800	812.8*) 820	1025	38	-	-	950	105	855	10	12	20	900	5	24	M36	(1 3/8")	39	-	-
900	914.4*) 920	1125	40	-	-	1050	110	955	10	12	20	1000	5	28	M36	(1 3/8")	39	-	-
1000	1016*) 1020	1255	42	-	-	1170	120	1058	10	16	20	1115	5	28	M39	(1 1/2")	42	-	-

DIN 25BAR



WELDING NECK



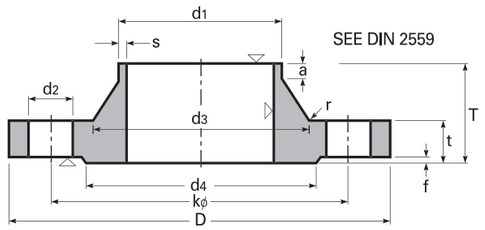
BLIND

DIN 2544 SLIP - ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2634 WELDING NECK FLANGES

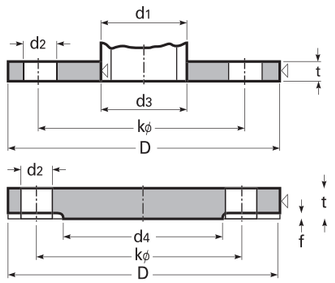
Unit : mm

Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
			t																
Nominal Bore	d1	D	Welding Neck	Slip-on	Blind	k	T	d3	s	r	a	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2573	DIN 2631
10	14 17.2*)	90	16	16	16	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.72	0.661
15	20 21.3*)	95	16	16	16	65	38	30 32	2	4	6	45	2	4	M12	(1/2")	14	0.81	0.746
20	25 26.9*)	105	18	18	18	75	40	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	1.24	1.06
25	30 33.7*)	115	18	18	18	85	40	42 46	2.6	4	6	68	2	4	M12	(1/2")	14	1.38	1.29
32	38 42.4*)	140	18	18	18	100	42	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	2.03	1.88
40	44.5 48.3*)	150	18	18	18	110	45	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.35	2.34
50	57 60.3*)	165	20	20	20	125	48	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	3.2	2.82
65	76.1*)	185	22	22	22	145	52	90	2.9	6	10	122	3	8	M16	(5/8")	18	4.29	3.74
80	88.9*)	200	24	24	24	160	58	105	3.2	8	12	138	3	8	M16	(5/8")	18	5.88	4.75
100	108 114.3*)	235	24	24	24	190	65	128 134	3.6	8	12	162	3	8	M20	(3/4")	23	7.54	6.52
125	133 139.7*)	270	26	26	26	220	68	155 162	4	8	12	188	3	8	M24	(7/8")	27	10.8	9.07
150	159 168.3*)	300	28	28	28	250	75	182 192	4.5	10	12	218	3	8	M24	(7/8")	27	14.5	11.8
200	216 219.1*)	360	30	30	30	310	80	240 244	6.3	10	16	278	3	12	M24	(7/8")	27	22.3	17
250	267 273*)	425	32	32	32	370	88	292 298	7.1	12	18	335	3	12	M27	(1")	30	33.5	24.4
300	318	485	34	34	34	430	92	345 352	8	12	18	395	4	16	M27	(1")	30	46.3	31.2
350	355.6*) 368	555	38	38	38	490	100	398	8	12	20	450	4	16	M30	(11/4")	33	68	45
400	406.4*) 419	620	40	40	40	550	110	452	8.8	12	20	505	4	16	M33	(11/4")	36	89.7	58.7
500	508*) 521	730	44	44	44	660	125	558	10	12	20	615	4	20	M33	(11/4")	36	138	86.1
600	609.6*) 622	845	46	-	-	770	125	660	11	12	20	720	5	20	M36	(13/8")	39	-	101
700	711.2*) 720	960	46	-	-	875	125	760	12.5	12	20	820	5	24	M39	(11/2")	42	-	134
800	812.8*) 820	1085	50	-	-	990	135	865	14.2	12	22	930	5	24	M45	(13/4")	48	-	183
900	914.4*) 920	1185	54	-	-	1090	145	968	16	12	24	1030	5	28	M45	(13/4")	48	-	232
1000	1016*) 1020	1320	58	-	-	1210	155	1070	17.5	16	24	1140	5	28	M52	(2")	56	-	302

DIN 40BAR



WELDING NECK



BLIND

DIN 2545 SLIP - ON FLANGES
DIN 2527 BLIND FLANGES
DIN 2635 WELDING NECK FLANGES

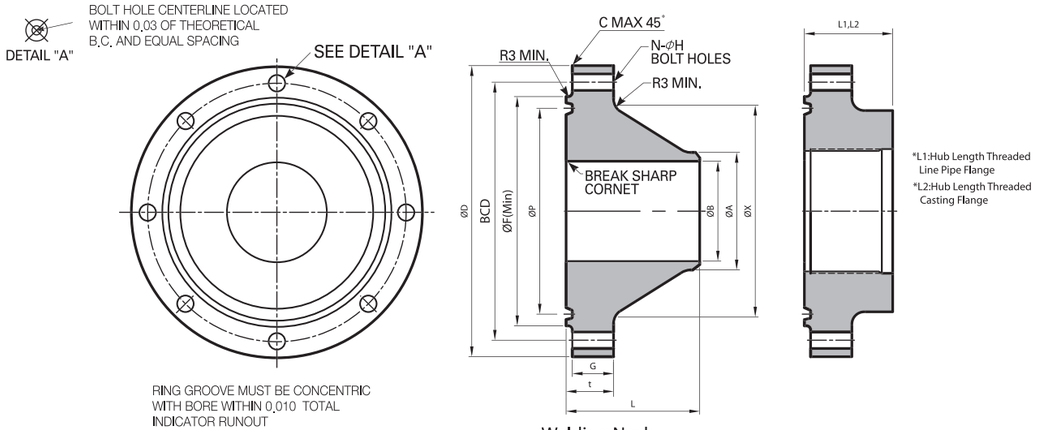
Unit : mm

Bore		Common Dimension						Hub				Raised Face		Drilling				Approx. Weight(kg)	
Nominal Bore	d1	D	t			k	T	d3	s	r	a	d4	f	Number of Bolt	Dia. of Bolt		d2	DIN 2573	DIN 2631
			Welding Neck	Slip-on	Blind														
10	14 17.2*)	90	16	16	16	60	35	25 28	1.8	4	6	40	2	4	M12	(1/2")	14	0.72	0.661
15	20 21.3*)	95	16	16	16	65	38	30 32	2	4	6	45	2	4	M12	(1/2")	14	0.81	0.746
20	25 26.9*)	105	18	18	18	75	40	38 40	2.3	4	6	58	2	4	M12	(1/2")	14	1.24	1.06
25	30 33.7*)	115	18	18	18	85	40	42 46	2.6	4	6	68	2	4	M12	(1/2")	14	1.38	1.29
32	38 42.4*)	140	18	18	18	100	42	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	2.03	1.88
40	44.5 48.3*)	150	18	18	18	110	45	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.35	2.33
50	57 60.3*)	165	20	20	20	125	48	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	3.2	2.82
65	76.1*)	185	22	22	22	145	52	90	2.9	6	10	122	3	8	M16	(5/8")	18	4.29	3.74
80	88.9*)	200	24	24	24	160	58	105	3.2	8	12	138	3	8	M16	(5/8")	18	5.88	4.75
100	108 114.3*)	235	24	24	24	190	65	128 134	3.6	8	12	162	3	8	M20	(3/4")	23	7.54	6.52
125	133 139.7*)	270	26	26	26	220	68	155 162	4	8	12	188	3	8	M24	(7/8")	27	10.8	9.07
150	159 168.3*)	300	28	28	28	250	75	182 192	4.5	10	12	218	3	8	M24	(7/8")	27	14.5	11.8
-175	-191 193.7*)	350	32	32	32	295	82	215 218	5.6	10	15	260	3	12	M27	(1")	30	22.1	18.2
200	216 219.1*)	375	34	34	34	320	88	240 244	6.3	10	16	285	3	12	M27	(1")	30	27.2	21.5
250	267 273*)	450	38	38	38	385	105	298 306	7.1	12	18	345	3	12	M30	(11/8")	33	43.8	34.9
300	318	515	42	42	42	450	115	352 362	8	12	18	410	4	16	M30	(11/8")	33	63.3	49.7
350	355.6*) 368	580	46	46	46	510	125	408	8.8	12	20	465	4	16	M33	(11/4")	36	89.5	68.1
400	406.4*) 419	660	50	50	50	585	135	462	11	12	20	535	4	16	M36	(13/8")	39	127	96.5
500	508*) 521	755	52	52	52	670	140	562	14.2	12	20	615	4	20	M39	(11/2")	42	172	117

API 6A - 1999
TYPE 6B & 6BX FLANGES



TYPE 6B & 6BX 2000psi



RING GROOVE MUST BE CONCENTRIC
WITH BORE WITHIN 0,010 TOTAL
INDICATOR RUNOUT

*Outside Diameter (D) TOLERANCE
- 2 1/16 ~ 5 1/8 : ± 1,52
- 7 1/16 ~ 30 : ± 3,05

*BOLT HOLE TOLERANCE(H)
- 2 1/16 ~ 13 5/8 : +1,52~-0,51
- 16 3/4 ~ 30 : +2,29~-0,51

*Neck Diameter Welding Neck(A) TOLERANCE
- 2 1/16 ~ 4 1/16 : +2,29 ~ -0,76
- 5,1/8 : +2,29 ~ -2,03
- 7,1/16 ~ 11 : +4,06 ~ -0,76

Welding Neck
Line Pipe Flange

*Large Dimeter of Hub(X) TOLERANCE
-26 3/4 ~ 30 : +0 ~ -3,05
*Total Thickness(t) TOLERANCE
- ±3,05, -0
* Hub Length Welding Neck(L) TOLERANCE
- ±1,52

Threaded Flange

* Neck Diameter Welding Neck(A) TOLERANCE
- 2 1/16 ~ 4 1/16 : +2,29 ~ -0,76
- 5 1/8 : +2,29 ~ -2,03
- 7 1/16 ~ 11: +4,06 ~ -0,76
- 26 3/4 ~ 30 : +0 ~ 3,05

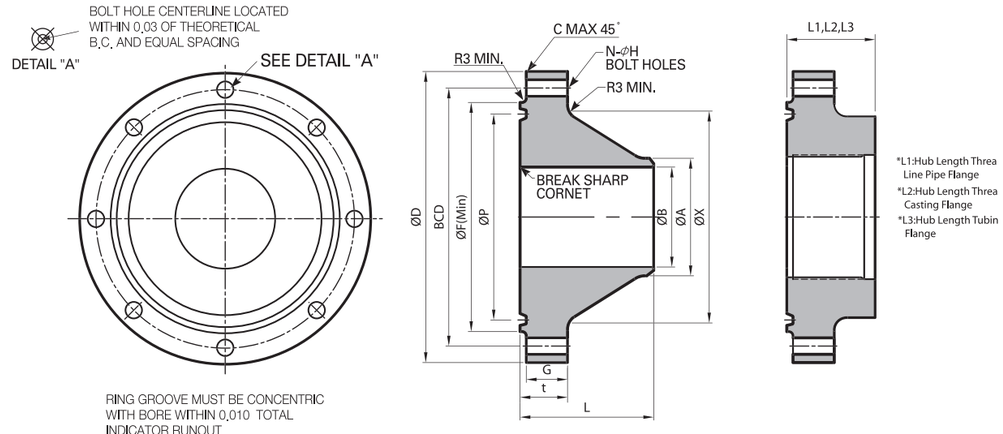
2000#

Unit : mm

Nominal Size & Bore of Flange	Outside Diam.	Max. Cham-fer	Max. Bore	Diam. of Raised Face	Total Thick.	Basic Thick.	Diam. of Hub	Neck Diam. of W.N	Hub Length of W.N	Hub Length	Hub Length	Pitch of Dia.	Diam. of Bolt Circle	Num. of Bolt	Dia. Of Bolt Holes	Ring No. (R or RX)	Ring No. (BX)
	D	C	B	F	t	G	X	A	L	L1	L2	P		N	H		
2 1/16	165.10	3.0	53.09	107.95	33.27	25.40	84.07	60.45	81.03	44.45	-	82.55	127.00	8	19.05	23	
2 9/16	190.50	3.0	65.79	127.00	36.58	28.45	100.08	73.15	87.38	49.28	-	101.60	149.35	8	22.35	26	
3 1/8	209.55	3.0	81.79	146.05	39.62	31.75	117.35	88.90	90.42	53.85	-	123.83	168.15	8	22.35	31	
4 1/16	273.05	3.0	108.71	174.75	45.97	38.10	152.40	114.30	109.47	61.98	88.90	149.23	215.90	8	25.40	37	
5 1/8	330.20	3.0	131.06	209.55	52.32	44.45	188.98	141.22	122.17	68.33	101.60	180.98	266.70	8	28.45	41	
7 1/16	355.60	6.4	181.86	241.30	55.63	47.75	222.25	168.40	125.48	74.68	114.30	211.15	292.10	12	28.45	45	
9	419.10	6.4	229.36	301.75	63.50	55.63	273.05	219.20	141.22	84.07	127.00	269.88	349.25	12	31.75	49	
11	508.00	6.4	287.02	355.60	71.37	63.50	342.90	273.05	160.27	93.73	133.35	323.85	431.80	16	35.05	53	
13 5/8	558.80	6.4	346.96	412.75	74.68	66.55	400.05	-	-	100.08	100.08	381.00	488.95	20	35.05	57	
16 3/4	685.80	6.4	426.21	508.00	84.07	76.20	495.30	-	-	114.30	114.30	469.90	603.25	20	41.15	65	
21 1/4	812.80	6.4	540.51	635.00	98.55	88.90	609.60	-	-	136.65	136.65	584.20	723.90	24	44.45	73	
26 3/4	1041.40	6.4	680.21	804.93	126.24	104.90	835.91	742.95	318.26	-	-	756.87	952.50	20	47.75		167
30	1122.43	6.4	762.76	908.05	134.11	111.50	931.93	833.12	337.31	-	-	848.61	1039.88	32	44.45		303

*Total Thickness of Flange and Minium Length of Hub

TYPE 6B & 6BX 3000psi



RING GROOVE MUST BE CONCENTRIC
WITH BORE WITHIN 0,010 TOTAL
INDICATOR RUNOUT

*Outside Diameter(ØD) TOLERANCE
- 2 1/16 ~ 5 1/8 : ±1,52
- 7 1/16 ~ 30 : ±3,05

*BOLT HOLE TOLERANCE(Ø H)
- 2 1/16 ~ 13 5/8 : +1,52~-0,51
- 16 3/4 ~ 30 : +2,29~-0,51

* Neck Diameter Welding Neck (A) TOLERANCE
- 2 1/16 ~ 5 1/8 : +2,29 ~ -0,76
- 7 1/16 ~ 11 : +4,06~ -0,76

Welding Neck
Line Pipe Flange

*Large Diameter of Hub(X) TOLERANCE
*Total Thickness(t) TOLERANCE
- ±3,05, -0
* Hub Length Welding Neck(L) TOLERANCE
- ±1,52

Threaded Flange

* Neck Diameter Welding Neck(A) TOLERANCE
- 2 1/16 ~ 5 1/8 : +2,29 ~ -0,76
- 7 1/16 ~ 11 : +4,06 ~ -0,76
- 26 3/4 ~ 30 : +0 ~ -3,05

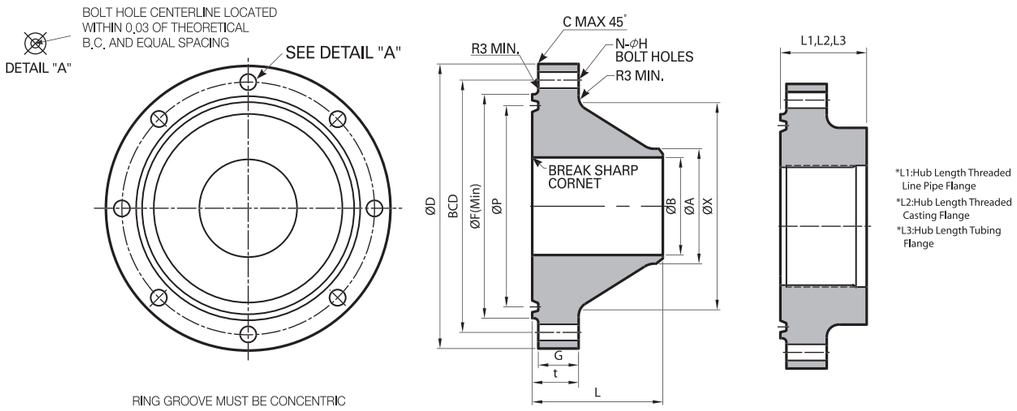
3000#

Unit : mm

Nominal Size & Bore of Flange	Outside Diam.	Max. Cham-fer	Max. Bore	Diam. of Raised Face	Total Thick.	Basic Thick.	Diam. of Hub	Neck Diam. of W.N	Hub Length of W.N	Hub Length	Hub Length	Hub Length	Pitch of Dia.	Diam. of Bolt Circle	Num. of Bolt	Dia. Of Bolt Holes	Ring No. (R or RX)	Ring No. (BX)
	D	C	B	F	t	G	X	A	L	L1	L2	L3	P		N	H		
2 1/16	215.90	3.0	53.09	123.95	45.97	38.10	104.65	60.45	109.47	65.02	-	65.02	95.25	165.10	8	25.40	24	
2 9/16	244.35	3.0	65.79	136.65	49.28	41.15	123.95	73.15	112.78	71.37	-	71.37	107.95	190.50	8	28.45	27	
3 1/8	241.30	3.0	81.79	155.45	45.97	38.10	127.00	88.90	109.47	61.98	-	74.68	123.83	190.50	8	25.40	31	
4 1/16	292.10	3.0	108.71	180.85	52.32	44.45	158.75	114.30	122.17	77.72	88.90	88.90	149.23	234.95	8	31.75	37	
5 1/8	349.25	3.0	131.06	215.90	58.67	50.80	190.50	141.22	134.87	87.38	101.60	-	180.98	279.40	8	35.05	41	
7 1/16	381.00	6.4	181.86	241.30	63.50	55.63	234.95	168.40	147.57	93.73	114.30	-	211.15	317.50	12	31.75	45	
9	469.90	6.4	229.36	307.85	71.37	63.50	298.45	219.20	169.93	109.47	127.00	-	269.88	393.70	12	38.10	49	
11	546.10	6.4	280.16	361.95	77.72	69.85	368.30	273.05	192.02	115.82	133.35	-	323.85	469.90	16	38.10	53	
13 5/8	609.60	6.4	346.96	419.10	87.38	79.25	419.10	-	-	125.48	125.48	-	381.00	533.40	20	38.10	57	
16 3/4	704.85	6.4	426.21	523.75	100.08	88.90	508.00	-	-	128.52	144.53	-	469.90	615.95	20	44.45	66	
20 3/4	857.25	6.4	527.81	647.70	120.65	107.95	622.30	-	-	171.45	171.45	-	584.20	749.30	20	53.85	74	
26 3/4	1101.85	6.4	680.21	831.85	161.04	139.70	869.95	776.22	353.06	-	-	-	761.29	1000.25	24	53.85		168
30	1185.67	6.4	762.76	922.27	167.13	144.53	970.03	871.22	370.33	-	-	-	848.61	1090.68	32	50.80		303

*Total Thickness of Flange and Minium Length of Hub

TYPE 6B & 6BX 5000psi



RING GROOVE MUST BE CONCENTRIC
WITH BORE WITHIN 0,010 TOTAL
INDICATOR RUNOUT

*Outside Diameter(ØD) TOLERANCE
- 2 1/16 ~ 5 1/8 : ± 1,52
- 7 1/16 ~ 21 1/4 : ± 3,05

*BOLT HOLE TOLERANCE(ØH)
- 2 1/16 ~ 7 1/16 : +1,52~ -0,51
- 9 ~ 21 1/4 : +2,29 ~ -0,51

* Neck Diameter Welding Neck(A) TOLERANCE
- 2 1/16 ~ 5 1/8 : +2,29 ~ -0,76
- 7 1/16 ~ 11 : +4,06 ~ -0,76

Welding Neck
Line Pipe Flange

*Large Diameter of Hub(X) TOLERANCE
*Total Thickness(t) TOLERANCE
- ±3,05, -0
* Hub Length Welding Neck (L) TOLERANCE
- ±1,52

Threaded Flange

* Neck Diameter Welding Neck(A) TOLERANCE
- 2 1/16 ~ 5 1/8 : +2,29 ~ -0,76
- 7 1/16 ~ 11 : +4,06 ~ -0,76
- 13 5/8 ~ 21 1/4 : +0 ~ -3,05

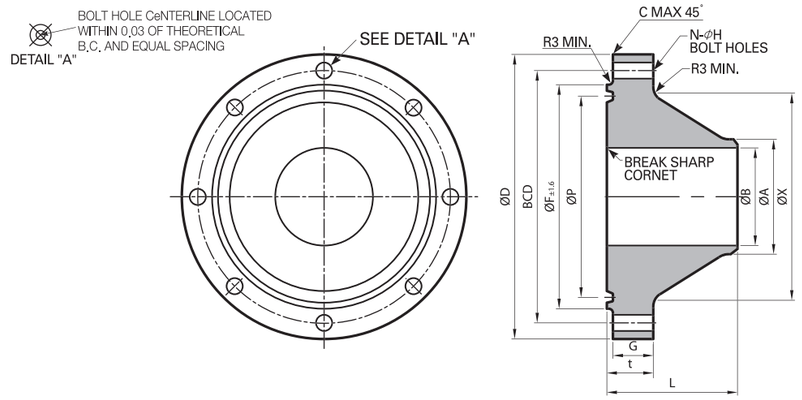
5000#

Unit : mm

Nominal Size & Bore of Flange	Outside Diam.	Max. Cham-fer	Max. Bore	Diam. of Raised Face	Total Thick.	Basic Thick.	Diam. of Hub	Neck Diam. of W.N	Hub Length of W.N	Hub Length	Hub Length	Hub Length	Pitch of Dia.	Diam. of Bolt Circle	Num. of Bolt	Dia. Of Bolt Holes	Ring No. (R or RX)	Ring No. (BX)
	D	C	B	F	t	G	X	A	L	L1	L2	L3	P		N	H		
2 1/16	215.90	3.0	53.09	123.95	45.97	38.10	104.65	60.45	109.47	65.02	-	65.02	95.25	165.10	8	25.40	24	-
2 9/16	244.35	3.0	65.79	136.65	49.28	41.15	123.95	73.15	112.78	71.37	-	71.37	107.95	190.50	8	28.45	27	-
3 1/8	266.70	3.0	81.79	168.15	55.63	47.75	133.35	88.90	125.48	81.03	-	81.03	136.53	203.20	8	31.75	35	-
4 1/16	311.15	3.0	108.71	193.55	61.98	53.85	162.05	114.30	131.83	98.55	98.55	98.55	161.93	241.30	8	35.05	39	-
5 1/8	374.65	3.0	131.06	228.60	81.03	73.15	196.85	141.22	163.58	112.78	112.78	-	193.68	292.10	8	41.15	44	-
7 1/16	393.70	6.4	181.86	247.65	91.95	82.55	228.60	168.40	181.10	128.52	128.52	-	211.15	317.50	12	38.10	46	-
9	482.60	6.4	229.36	317.50	103.12	91.95	292.10	219.20	223.77	153.92	153.92	-	269.88	393.70	12	44.45	50	-
11	584.20	6.4	280.16	371.60	119.13	107.95	368.30	273.05	265.18	169.93	169.93	-	323.85	482.60	12	50.80	54	-
13 5/8	673.10	6.4	346.96	457.20	112.78	98.55	481.08	423.93	233.43	-	-	-	398.02	590.55	16	44.45	-	160
16 3/4	771.65	6.4	426.21	534.92	130.30	121.92	555.75	527.05	212.85	-	-	-	469.38	676.15	16	50.80	-	162
18 3/4	904.75	6.4	477.01	627.13	165.86	147.57	674.62	598.42	324.61	-	-	-	550.72	803.15	20	53.85	-	163
21 1/4	990.60	6.4	540.51	701.55	180.85	161.80	758.95	679.45	352.30	-	-	-	618.96	885.95	24	53.85	-	165

*Total Thickness of Flange and Minium Length of Hub

TYPE 6BX 10000psi



B TO RING GROOVE MUST BE CONCENTRIC WITHIN
0,010 TOTAL INDICATOR RUNOUT

*Outside Diameter(ØD) TOLERANCE
- 1 13/16 ~ 5 1/8 : ±1,52
- 7 1/16 ~ 21 1/4 : ±3,05

* BOLT HOLE TOLERANCE(ØH)
- 1 13/16 ~ 5 1/8 : +1,52 ~ -0,51
- 7 1/16 ~ 21 1/4 : +2,29 ~ -0,51

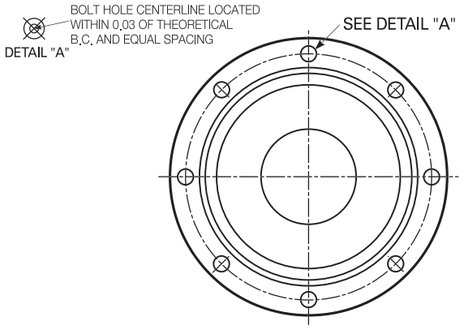
*Total Thickness(t) TOLERANCE
- ±3,05, -0
* Hub Length Welding Neck(L) TOLERANCE
- +0, -3,05
* Large Diameter of Hub (X) TOLERANCE
- +0 ~ -3,05
* Total Thickness (t) TOLERANCE
- +3,05, -0

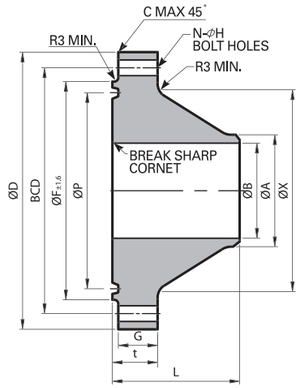
10000#

Unit : mm

Nominal Size & Bore of Flange	Outside Diam.	Max. Bore	Max. Chamfer	Diam. of Raised Face	Total Thick.	Diam. of Hub	Neck Diam. of W.N	Hub Length of W.N	Pitch of Diam.	Diam. of Bolt Circle	Num. of Bolt	Diam. of Bolt Holes	Ring No. (BX)
	D	B	C	F	T	X	A	L	P		N	H	
1 13/16	187.45	46.74	3.0	104.65	42.16	88.90	65.02	97.03	71.86	146.05	8	22.35	151
2 1/16	200.15	53.09	3.0	111.25	43.94	100.08	74.68	101.85	79.91	158.75	8	22.35	152
2 9/16	231.65	65.79	3.0	131.83	51.31	120.65	91.95	114.81	95.73	184.15	8	25.40	153
3 1/16	269.75	78.49	3.0	152.40	58.42	141.99	110.24	128.27	111.30	215.90	8	28.45	154
4 1/16	315.98	103.89	3.0	184.91	70.36	182.63	146.05	149.86	141.76	258.83	8	31.75	155
5 1/8	357.12	131.06	3.0	220.73	79.25	223.77	182.63	166.62	168.20	299.97	12	31.75	169
7 1/16	479.55	180.09	6.4	301.75	103.12	301.75	254.00	204.72	230.14	403.35	12	41.15	156
9	552.45	229.36	6.4	358.65	123.95	374.65	327.15	224.03	285.86	476.25	16	41.15	157
11	654.05	280.16	6.4	428.75	141.22	450.85	400.05	250.70	342.63	565.15	16	47.75	158
13 5/8	768.35	346.96	6.4	517.65	168.15	552.45	495.30	288.80	416.39	673.10	20	50.80	159
16 3/4	871.47	426.21	6.4	576.33	168.15	655.57	601.73	250.70	469.38	776.22	24	50.80	162
18 3/4	1039.88	477.01	6.4	696.98	223.01	752.35	674.62	384.81	561.52	925.58	24	60.45	164
21 1/4	1143.00	540.51	6.4	781.05	241.30	847.85	762.00	412.75	630.44	1022.35	24	66.55	166

TYPE 6BX 15000psi





R TO RING GROOVE MUST BE CONCENTRIC
WITHIN 0,010 TOTAL INDICATOR RUNOUT

*Outside Diameter(ØD) TOLERANCE
- 1 13/16 ~ 5 1/8 : ±1,52
- 7 1/16 ~ 18 3/4 : ±3,05

* BOLT HOLE TOLERANCE(ØH)
- 1 13/16 ~4 1/16 : +1,52~ -0,51
- 5 1/8 ~ 13 5/8 : +2,29 ~ -0,51
- 18 3/4 : +3,05 ~ -0,51

*Total Thickness(t) TOLERANCE
- ±3,05, -0

* Hub Length Welding Neck(L) TOLERANCE
- +0, -3,05

*Large Diameter of Hub (X) TOLERANCE
- +0 ~ -3,05

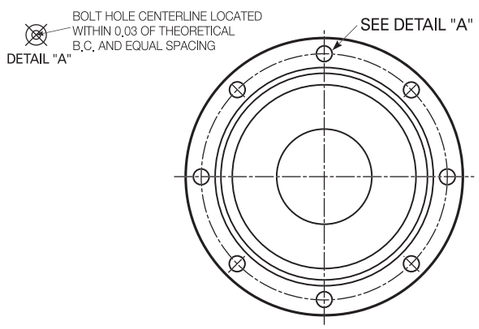
* Total Thickness (t) TOLERANCE
- +3,05, -0

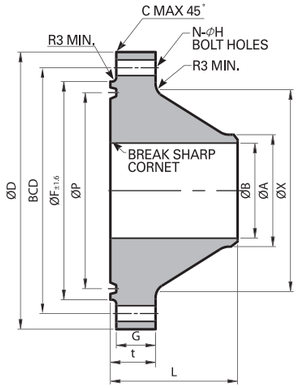
15000#

Unit : mm

Nominal Size & Bore of Flange	Outside Diam."	Max. Chamfer	Max. Bore	Diam. of Raised Face	Total Thick.	Diam. of Hub	Neck Diam. of W.N	Hub Length of W.N	Pitch of Diam.	Diam. of Bolt Circle	Num. of Bolt	Diam. of Bolt Holes	Ring No. (BX)
	D	B	C	F	T	X	A	L	P		N	H	
1 13/16	208.03	3.0	46.74	106.43	45.21	97.54	71.37	99.31	71.86	160.27	8	25.40	151
2 1/16	222.25	3.0	53.09	114.30	50.80	111.25	82.55	111.00	79.91	174.75	8	25.40	152
2 9/16	254.00	3.0	65.79	133.35	57.15	128.52	100.08	120.65	95.73	200.15	8	28.45	153
3 1/16	287.27	3.0	78.49	153.92	64.26	153.92	122.17	134.11	111.30	230.12	8	31.75	154
4 1/16	360.43	3.0	103.89	193.55	78.49	195.33	158.75	157.99	141.76	290.58	8	38.10	155
5 1/8	419.10	3.0	131.06	225.55	98.55	244.35	200.15	186.69	168.20	342.90	12	41.15	169
7 1/16	504.95	6.4	180.09	304.80	119.13	325.37	276.35	192.02	230.14	428.75	16	41.15	156
9	647.70	6.4	229.36	381.00	146.05	431.80	349.25	276.35	285.86	552.45	16	50.80	157
11	812.80	6.4	280.16	454.15	187.45	584.20	426.97	429.51	342.63	711.20	20	53.85	158
13 5/8	885.95	6.4	346.96	541.27	204.72	595.38	528.57	325.37	416.39	771.65	20	60.45	159
18 3/4	1162.05	6.4	477.01	722.38	255.52	812.80	730.25	417.32	561.52	1016.00	20	79.25	164

TYPE 6BX 20000psi





R TO RING GROOVE MUST BE CONCENTRIC
WITHIN 0,010 TOTAL INDICATOR RUNOUT

*Outside Diameter(ØD) TOLERANCE
- 1 13/16 ~ 4 1/16 : ±1,52
- 7 1/16 ~ 13 5/8 : ±3,05

* BOLT HOLE TOLERANCE(ØH)
- 1 13/16 ~ 3 1/16 : +1,52 ~ -0,51
- 4 1/16 ~ 11 : +2,29 ~ -0,51
- 13 5/8 : +3,05 ~ -0,51

*Total Thickness(t) TOLERANCE
- ±3,05, -0

* Hub Length Welding Neck(L) TOLERANCE
- +0, -3,05

*Large Diameter(X) TOLERANCE
- +0, 3,05

*Total Thickness(t) TOLERANCE
- +3,05,-0

20000#

Unit : mm

Nominal Size & Bore of Flange	Outside Diam."	Max. Chamfer	Max. Bore	Diam. of Raised Face	Total Thick.	Diam. of Hub	Neck Diam. of W.N	Hub Length of W.N	Pitch of Diam.	Diam. of Bolt Circle	Num. of Bolt	Diam. of Bolt Holes	Ring No. (BX)
	D	B	C	F	T	X	A	L	P		N	H	
1 13/16	257.05	3.0	46.74	117.35	63.50	133.35	109.47	119.13	71.86	203.20	8	28.45	151
2 1/16	287.27	3.0	53.09	131.83	71.37	153.92	127.00	130.05	79.91	230.12	8	31.75	152
2 9/16	325.37	3.0	65.78	150.88	79.25	172.97	144.53	144.27	95.73	261.87	8	35.05	153
3 1/16	357.12	3.0	78.49	171.45	85.85	192.02	160.27	155.70	111.30	287.27	8	38.10	154
4 1/16	446.02	3.0	103.89	218.95	106.43	242.82	206.25	185.93	141.76	357.12	8	47.75	155
7 1/16	655.57	6.4	180.09	352.55	165.10	385.83	338.07	268.22	230.14	553.97	16	53.85	156
9	804.93	6.4	229.36	441.45	204.72	481.08	428.75	319.02	285.86	685.80	16	66.55	157
11	882.65	6.4	280.16	504.95	223.77	566.67	508.00	333.25	342.63	749.30	16	73.15	158
13 5/8	1162.05	6.4	346.96	614.43	292.10	693.67	628.65	431.80	416.39	1016.00	20	79.25	159

TABLE 1

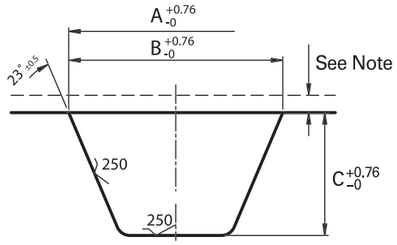


TABLE 1. Rough Machining Detail for Corrosion Resistant API Ring Groove

Unit : mm

(1)	(2)	(3)	(4)
Ring Number	Outside Diameter of Groove	Width of Groove	Width of Groove
	A	B	C
BX-150	81.79	18.29	9.14
BX-151	86.11	18.80	9.14
BX-152	94.49	19.56	9.65
BX-153	111.25	21.08	10.41
BX-154	127.25	22.35	11.18
BX-155	159.00	24.64	11.94
BX-156	250.19	30.48	14.73
BX-157	307.34	33.53	16.26
BX-158	365.51	36.07	17.78
BX-159	440.94	39.37	19.56
BX-160	416.31	26.92	17.78
BX-162	486.66	24.89	11.94
BX-163	571.75	32.51	21.84
BX-164	586.23	39.88	21.84
BX-165	640.84	34.29	22.61
BX-166	656.34	41.91	22.61
BX-167	776.73	29.97	24.89
BX-168	782.57	32.77	24.89
BX-169	185.17	23.88	13.21
R-20	85.34	15.75	9.91
R-23	102.87	19.05	11.43
R-24	115.57	19.05	11.43
R-25	118.62	15.75	9.91
R-26	121.92	19.05	11.43
R-27	128.27	19.05	11.43
R-31	144.02	19.05	11.43
R-35	156.72	19.05	11.43
R-37	169.42	19.05	11.43
R-39	182.12	19.05	11.43
R-41	201.17	19.05	11.43

(1)	(2)	(3)	(4)
Ring Number	Outside Diameter of Groove	Width of Groove	Width of Groove
	A	B	C
R-44	213.87	19.05	11.43
R-45	231.39	19.05	11.43
R-46	232.92	20.57	13.21
R-47	256.79	26.92	16.26
R-49	290.07	19.05	11.43
R-50	294.89	23.88	14.73
R-53	344.17	19.05	11.43
R-54	349.00	23.88	14.73
R-57	401.32	19.05	11.43
R-63	454.41	34.04	19.56
R-65	490.22	19.05	11.43
R-66	495.05	23.88	14.73
R-69	553.72	19.05	11.43
R-70	561.59	26.92	16.26
R-73	606.04	20.57	13.21
R-74	612.39	26.92	16.26
R-82	77.47	19.05	11.43
R-84	83.82	19.05	11.43
R-85	101.35	20.57	13.21
R-86	115.57	23.88	14.73
R-87	124.97	23.88	14.73
R-88	152.15	26.92	16.26
R-89	142.49	26.92	16.26
R-90	186.94	30.23	17.78
R-91	302.01	40.39	21.08
R-99	255.27	19.05	11.43
R-201	59.94	12.70	7.62
R-205	71.12	12.70	10.67
R-210	106.68	16.76	9.91
R-215	150.37	19.05	11.43

Notes :

Allow 1/8 in. or greater for final machining of weld overlay

TABLE 2

TOLERANCES

A (width of ring)——————————±0.203
B&H(height of ring)——————————±0.508
C(width of flat on octagonal ring) —— ±0.203
E(depth of groove)——————————— +0.508/-0
F(width of groove)——————————±0.203
P(average pith diameter of ring)———±0.178
(average pith diameter of groove)—±0.127
R1(radius in rings)———————————±0.508
R2(radius in groove)———————————max
23°(angle)————————————————±½deg

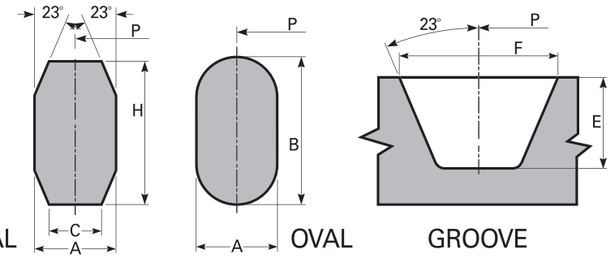
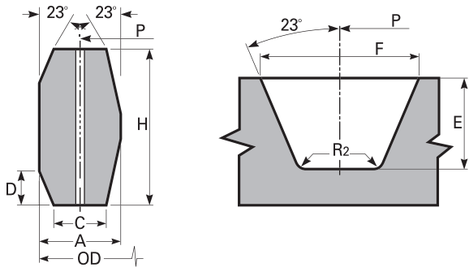


TABLE 2. Type R Ring Gaskets

Unit : mm

Ring Number	Pitch Diameter of Ring and Groove	Width of Ring	Height of Ring Oval	Height of Ring Octagonal	Width of Flat of Octagonal Ring	Radius in Octagonal Ring	Depth of Groove	Width of Groove	Radius in Groove	Approx. Distance Between Made-up Flanges
	P	A	B	H	C	R1	E	F	R2	S
R 20	68.28	7.95	14.22	12.70	5.23	1.52	6.35	8.74	0.76	4.06
R 23	82.55	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 24	95.25	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 26	101.60	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 27	107.95	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 31	123.83	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 35	136.53	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 37	149.23	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 39	161.93	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 41	180.98	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 44	193.68	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 45	211.15	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 46	211.15	12.70	19.05	17.53	8.66	1.52	9.65	13.49	1.52	4.83
R 47	228.60	19.05	25.40	23.88	12.32	1.52	12.70	19.84	1.52	4.06
R 49	269.88	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 50	269.88	15.88	22.35	20.57	10.49	1.52	11.18	16.66	1.52	4.06
R 53	323.85	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 54	323.85	15.88	22.35	20.57	10.49	1.52	11.18	16.66	1.52	4.06
R 57	381.00	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 63	419.10	25.40	33.27	31.75	17.30	2.29	15.75	27.00	2.29	5.59
R 65	469.90	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 66	469.90	15.88	22.35	20.57	10.49	1.52	11.18	16.66	1.52	4.06
R 69	533.40	11.13	17.53	16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 70	533.40	19.05	25.40	23.88	12.32	1.52	12.70	19.84	1.52	4.83
R 73	584.20	12.70	19.05	17.53	8.66	1.52	9.65	13.49	1.52	3.30
R 74	584.20	19.05	25.40	23.88	12.32	1.52	12.70	19.84	1.52	4.83
R 82	57.15	11.13		16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 84	63.50	11.13		16.00	7.75	1.52	7.87	11.91	0.76	4.83
R 85	79.38	12.70		17.53	8.66	1.52	9.65	13.49	1.52	3.30
R 86	90.50	15.88		20.57	10.49	1.52	11.18	16.66	1.52	4.06
R 87	100.03	15.88		20.57	10.49	1.52	11.18	16.66	1.52	4.06
R 88	123.83	19.05		23.88	12.32	1.52	12.70	19.84	1.52	4.83
R 89	114.30	19.05		23.88	12.32	1.52	12.70	19.84	1.52	4.83
R 90	155.58	22.23		26.92	14.81	1.52	14.22	23.01	1.52	4.83
R 91	260.35	31.75		38.10	22.33	2.29	17.53	33.35	2.29	4.06
R 99	234.95	11.13		16.00	7.75	1.52	7.87	11.91	0.76	4.83

TABLE 3



A* (width of ring)------±0.203/-0
C(width of flat) -------- +0.015,-0
D(height of chamfer)----+0/-0.762
E(depth of groove)------+0.508/-0
F(width of groove)--------±0.203

H* (height of ring)-----+0.203/-0
OD(OD of ring) ------ +0.508/-0
p(average pitch diameter of groove)---±0.127
R1(radius in rings)------±0.508
R2(radius in groove)-------max
23°(angle)----------±½deg

*A plus tolerance of 0.008 in. for width A and height H is permitted, provided the variation in width or height of any ring does not exceed 0.004 in. throughout its entire circumference

*Note: The pressure passage hole illustrated in the RX ring cross section in rings RX-82 through RX-91 only. Centerline of hole shall be located at midpoint of dimension C. Hole diameter shall be 0.06 in. for rings RX-82 through RX-85, 0.09 in. for rings RX-86, and RX-87, and 0.12 in. for rings RX-88 through RX-91.

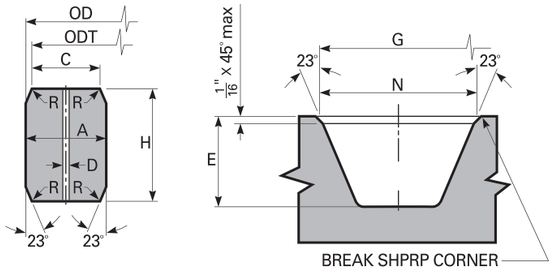
TABLE 3. API Type RX Pressure Energized Ring Gaskets

Unit : mm

Ring Number	Pitch Diameter of Ring and Groove	Outside Diameter of Ring	Width of Ring	Width of Flat	Height of Outside Bevel	Height of Ring	Radius in Ring	Depth of Groove	Width of Groove	Radius in Groove	Approx. Distance Between Made-up Flanges
	P	OD	A	C	D	H	R1	E	F	R2	S
RX 20	68.3	76.2	8.7	4.6	3.2	19.1	1.5	6.4	8.7	0.8	9.7
RX 23	82.6	93.3	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 24	95.3	106.0	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 25	101.6	109.6	8.7	4.6	3.2	19.1	1.5	6.4	8.7	0.8	-
RX 26	101.6	111.9	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 27	108.0	118.3	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 31	123.8	134.5	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 35	136.5	147.2	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 37	136.5	159.9	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 39	161.9	172.6	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 41	181.0	191.7	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 44	193.7	204.4	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 45	211.2	221.8	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 46	211.2	222.3	13.5	6.7	4.8	28.6	1.5	9.7	13.5	1.5	11.9
RX 47	228.6	245.3	19.8	10.3	6.9	41.3	2.3	12.7	19.8	1.5	23.1
RX 49	269.9	280.6	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 50	269.9	283.4	16.7	8.5	5.3	31.8	1.5	11.2	16.7	1.5	11.9
RX 53	323.9	334.6	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 54	323.9	337.3	16.7	8.5	5.3	31.8	1.5	11.2	16.7	1.5	11.9
RX 57	381.0	391.7	11.9	9.0	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 63	419.1	441.7	27.0	14.8	8.5	50.8	2.3	16.0	27.0	2.3	21.3
RX 65	469.9	480.6	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 66	469.9	483.4	16.7	8.5	5.3	31.8	1.5	11.2	16.7	1.5	11.9
RX 69	533.4	544.1	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 70	533.4	550.1	19.8	10.3	6.9	41.3	2.3	12.7	19.8	1.5	18.3
RX 73	584.2	596.1	13.5	6.7	5.3	31.8	1.5	9.7	13.5	1.5	15.0
RX 74	584.2	600.9	19.8	10.3	6.9	41.3	2.3	12.7	19.8	1.5	18.3
RX 82	57.2	67.9	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 84	63.5	74.2	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 85	79.4	90.1	13.5	6.7	4.2	25.4	1.5	9.7	13.5	1.5	9.7
RX 86	90.5	103.6	15.1	8.5	4.8	28.6	1.5	11.2	16.7	1.5	9.7
RX 87	100.0	113.1	15.1	8.5	4.8	28.6	1.5	11.2	16.7	1.5	9.7
RX 88	123.8	139.3	17.5	10.3	5.3	31.8	1.5	12.7	19.8	1.5	9.7
RX 89	114.3	129.8	18.3	10.3	5.3	31.8	1.5	12.7	19.8	1.5	9.7
RX 90	155.6	174.6	19.8	12.2	7.4	44.5	2.3	14.2	23.0	1.5	18.3
RX 91	260.4	286.9	30.2	19.8	7.5	45.2	2.3	17.5	33.4	2.3	19.1
RX 99	235.0	245.7	11.9	6.5	4.2	25.4	1.5	7.9	11.9	0.8	11.9
RX 201	46.1	51.5	5.7	3.2	1.4	1.45a	11.3	0.5b	4.1	0.8	-
RX 205	57.2	62.3	5.6	3.0	1.8	1.83a	11.1	0.5b	4.1	0.5	-
RX 210	88.9	97.6	9.5	5.4	3.2	3.18a	19.1	0.8b	6.4	0.8	-
RX 215	130.2	140.9	11.9	5.3	4.2	4.24a	25.4	1.5b	7.9	0.8	-

a) Tolerance on these dimensions is +0, -0.381
b) Tolerance on these dimensions is +0.508, -0

TABLE 4



One pressure passage hole required per gasket on centerline.

TOLERANCES
Aa (width of ring)----+0.203/-0
C(width of flat)-------+0.152/-0
D(hole size) ----------±0.508
E(depth of groove)---+0.508/-0
G(OD of groove)------+0.102/-0

Ha(height of ring)-----+0.203/0
N(width of groove)----+0.102/-0
OD(OD of ring)------+0/-0.152
ODT(OD of flat)--------±0.051
R(radius in ring)------see note
23°(angle)----------±¼°

[a] A plus tolerance of 0.008 in. for width A and height H is permitted, provided the variation in width or height of any ring does not exceed 0.004 in. throughout its entire circumference.

*Radius "R" shall be 8 to 12% of the gasket height "H"

TABLE 4. API Type BX Pressure Energized Ring Gaskets

Unit : mm

Ring Number	Number Size	Outside Diameter of Ring	Height of Ring	Width of Ring	Diameter of Flat	Width of Flat	Hole Size	Depth of Groove	Outside Dimeter of Groove	Width of Groove
		OD	H	A	ODT	C	D	E	G	T
BX 150	1 11/16	72.19	9.30	9.30	70.87	7.98	1.52	5.59	73.48	11.43
BX 151	1 13/16	76.40	9.63	9.63	75.03	8.26	1.52	5.59	77.77	11.84
BX 152	2 1/16	84.68	10.24	10.24	83.24	8.79	1.52	5.84	86.23	12.65
BX 153	2 9/16	100.94	11.38	11.38	99.31	9.78	1.52	6.86	102.77	14.07
BX 154	3 1/16	116.84	12.40	12.40	115.09	10.64	1.52	7.62	119.00	15.39
BX 155	4 1/16	147.96	14.22	14.22	145.95	12.22	1.52	8.38	150.62	17.73
BX 156	7 1/16	237.92	18.62	18.62	235.28	15.98	3.05	11.18	241.83	23.39
BX 157	9	294.46	20.98	20.98	291.49	18.01	3.05	12.70	299.06	26.39
BX 158	11	352.04	23.14	23.14	348.77	19.86	3.05	14.22	357.23	29.18
BX 159	13 5/8	426.72	25.70	25.70	423.09	22.07	3.05	15.75	432.64	32.49
BX 160	13 5/8	402.59	23.83	13.74	399.21	10.36	3.05	14.22	408.00	19.96
BX 161	16 5/8	491.41	28.07	16.21	487.45	12.24	3.05	17.02	497.94	23.62
BX 162	16 5/8	475.49	14.22	14.22	473.48	12.22	1.52	8.38	478.33	17.91
BX 163	18 3/4	556.16	30.10	17.37	551.89	13.11	3.05	18.29	563.50	25.55
BX 164	18 3/4	570.56	30.10	24.59	566.29	20.32	3.05	18.29	577.90	32.77
BX 165	21 1/4	624.71	32.03	18.49	620.19	13.97	3.05	19.05	632.56	27.20
BX 166	21 1/4	640.03	32.03	26.14	635.51	21.62	3.05	19.05	647.88	34.87
BX 167	26 3/4	759.36	35.86	13.11	754.28	8.03	1.52	21.34	768.32	22.91
BX 168	26 3/4	765.25	35.86	16.05	760.17	10.97	1.52	21.34	774.22	25.86
BX 169	5 1/8	173.51	15.85	12.93	171.27	10.69	1.52	9.65	176.66	16.92
BX 170	9	218.03	14.22	14.22	216.03	12.22	1.52	8.38	220.88	17.91
BX 171	11	267.44	14.22	14.22	265.43	12.22	1.52	8.38	270.28	17.91
BX 172	13 5/8	333.07	14.22	14.22	331.06	12.22	1.52	8.38	335.92	17.91
BX 303	30	852.75	37.95	16.97	847.37	11.61	1.52	22.61	862.30	27.38