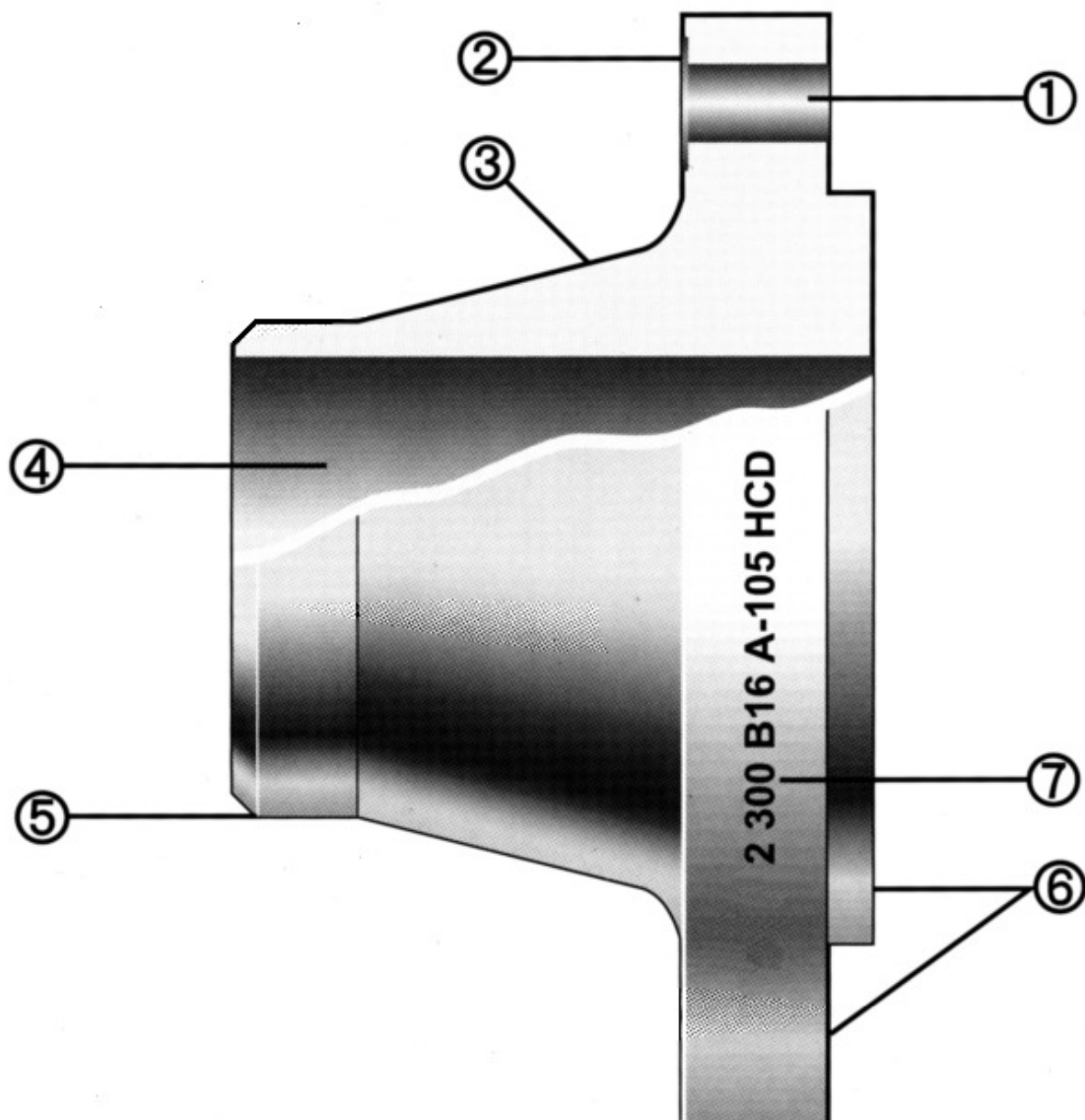


## Section III : Flanges



1. Holes accurately drilled for ease of assembly.
2. Spot facing ensures seating of fasteners true and square.
3. Grain flow controlled for maximum strength.
4. Smooth accurate bore for unrestricted flow.
5. Machined bevel and land facilitate good welding.
6. All faces machined within tolerances to ensure true alignment.
7. Full identification of size, pressure class, material and heat code.

## Material and Manufacturing Standards

The manufacture of forged steel flanges is governed by industry standards written by (1) the American Society for Testing and Materials (ASTM); (2) the American National Standards Institute (ANSI); (3) the Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS); (4) the American Petroleum Institute (API); (5) the Canadian Standards Association (CSA); (6) the American Society of Mechanical Engineers (ASME); and (7) the Pipe Fabrication Institute (PFI). They cover specifications for materials, methods of manufacture, dimensions and quality control procedures. forged steel flanges conform to all applicable standards.

### ASTM SPECIFICATIONS

ASTM specifications are, basically, materials specifications. They regulate approved raw materials from which flanges can be made ingots, or blooms, billets, slabs or bars. In addition, they govern the methods of manufacture, quality control procedures and marking of forged steel flanges. ASTM specifications are divided into five categories:

A105 - Carbon grades for high temperature service

A181 - Carbon grades for general service

\*A182 - Alloy and stainless grades for high temperature service

A350 - Carbon and alloy grades for low temperature service

\*APCO Flanges are available in a wide range of alloy and stainless steels, including grades F304, F304L, F316, F316L.

### MSS, API, AWWA AND ANSI STANDARDS

ANSI, MSS and API standards govern flange dimensions and tolerances. ANSI B16.5, ANSI B16.47 Series A and ANSI B16.47 Series B, titled "Steel Pipe Flanges and Flanged Fittings", is the basic standard. It covers forged steel flanges, sizes NPS 1/2 (DN 15) through NPS 24 (DN 600). ANSI B16.36 covers Orifice Flanges. The following MSS and API standards are written to supplement B16.5:

MSS SP-6: Flange facings

MSS SP-9: Spot facing for bronze, iron and steel flanges

MSS SP-25: Marking of flanges

MSS SP-39: Bolts and nuts for flanges

MSS SP-44: Large diameter pipe line flanges NPS 22 (DN 550) and NPS 26 (DN 650) through NPS 36 (DN 900).

API 6A: Wellhead equipment

API 605: Large diameter flanges for petroleum usage NPS 26 (DN 650) through NPS 60 (DN 1500).

AWWA C207: Hub flanges

The following codes are not flange specifications, but they influence the manufacture of forged steel flanges:

ASME: Boiler and Pressure Vessel Code

ANSI B31.1: Power piping

ANSI B31.2: Fuel gas piping

ANSI B31.3: Petroleum refinery piping

ANSI B31.4: Liquid petroleum transportation piping systems

ANSI B31.5: Refrigeration piping

ANSI B31.7: Nuclear power piping

ANSI B31.8: Gas transmission and distribution piping systems

ANSI B36.10: Standard for wrought steel pipe

ANSI B36.19: Standard for stainless steel pipe

### METRIC EQUIVALENTS

The International System (SI) metric equivalent

of British units are shown throughout this catalogue.

NPS (Nominal Pipe Size) = DN\* (Nominal Diameter)

Operating Pressure Class = PN\* (Pressure Number)

1 inch

1 pound, weight

1 pound, pressure

1 p.s.i., stress

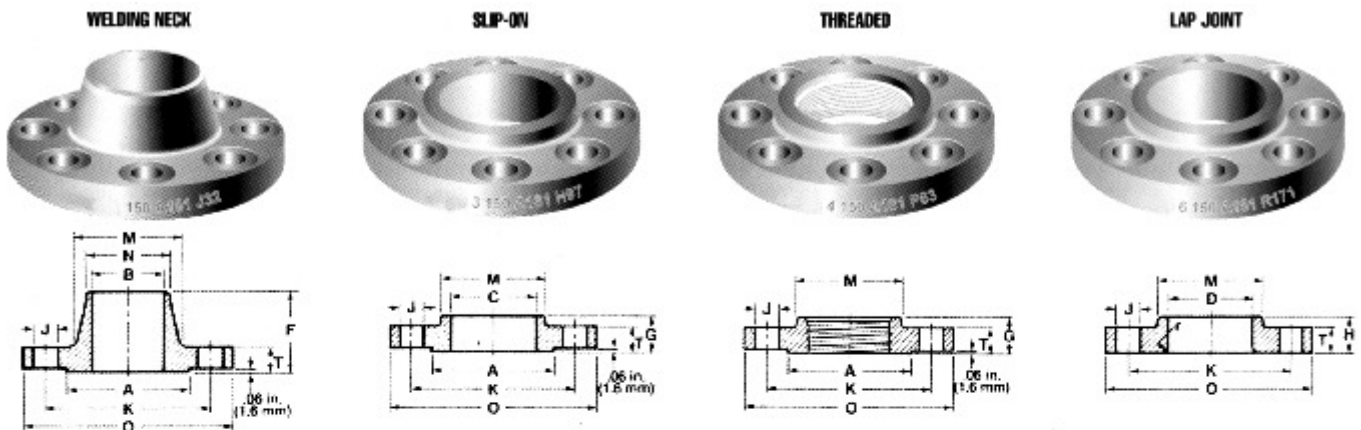
= 25.4 millimetres

= 0.4536 kilograms

= 0.06895 bars

= 0.006895 megapascals (MPa)

\* From the SI designations, Diametre Nominal and Pression Nominale.



NPS	DN	FLANGE OUTSIDE DIAMETER	FLANGE <sup>2</sup> THICKNESS MIN.	RAISED FACE DIA.	BORE			LENGTH THRU HU <sup>3</sup>		
					WELDING NECK & SOCKET MIN.	SLIP-ON & SOCKET WELD SOCKET MIN.	LAP JOINT MIN.	WELDING NECK	SLIP-ON THREADED & SOCK. WELD	LAP JOINT
		O	T	A	B <sup>4</sup>	C	D	F	G	H
1/2	15	3.50	.44	1.38	.62	.95	.90	1.00	.62	.62
3/4	20	3.88	.50	1.60	.82	1.00	1.11	2.00	.62	.62
1	25	4.25	.56	2.00	1.05	1.36	1.38	2.19	.69	.69
1 1/4	32	4.62	.62	2.50	1.38	1.70	1.72	2.25	.81	.81
1 1/2	40	5.00	.69	2.88	1.61	1.95	1.97	2.44	.88	.88
2	50	6.00	.75	3.62	2.07	2.44	2.46	2.50	1.00	1.00
2 1/2	65	7.00	.88	4.12	2.47	2.94	2.97	2.75	1.12	1.12
3	80	7.50	.94	5.00	3.07	3.57	3.60	2.75	1.19	1.19
3 1/2	90	8.50	.94	5.50	3.55	4.07	4.10	2.81	1.25	1.25
4	100	9.00	.94	6.19	4.03	4.57	4.60	3.00	1.31	1.31
5	125	10.00	.94	7.31	5.05	5.66	5.60	3.50	1.44	1.44
6	150	11.00	1.00	8.50	6.07	6.72	6.75	3.50	1.55	1.55
8	200	13.50	1.12	10.62	7.98	8.72	8.75	4.00	1.75	1.75
10	250	16.00	1.19	12.75	10.02	10.88	10.92	4.00	1.94	1.94
12	300	18.00	1.25	15.00	12.00	12.88	12.92	4.50	2.19	2.19
14	350	21.00	1.30	16.25	TO RF	14.14	14.18	5.00	2.25	3.12
16	400	23.50	1.44	18.50	SPECIFIED	16.16	16.19	5.00	2.50	3.44
18	450	25.00	1.56	21.00	BY	18.18	18.20	5.50	2.60	3.51
20	500	27.50	1.68	23.00	PURCHASER	20.20	20.25	5.50	2.66	4.05
24	600	32.00	1.88	27.25		24.25	24.25	6.00	3.25	4.39
		615	46.0	69.2		615.8	616.9	152.4	83	111

<sup>1</sup>Socket Welding Flanges, sizes NPS 3-1/2 (DN 90) and larger are not covered by ANSI B16.5

<sup>2</sup>Includes .06" (1.6 mm) raised face.

<sup>3</sup>Those dimensions correspond to inside diameters of pipe as given in ANSI B36.10 for Standard Wall Pipe. Thickness of Standard Wall is the same as Schedule 40 in size NPS 10 (DN 250) and smaller.

<b>INCHES</b>
<b>MILLIMETRES</b>



SOCKET WELDING

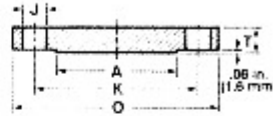
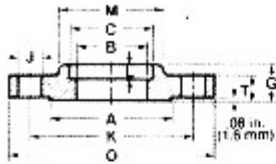


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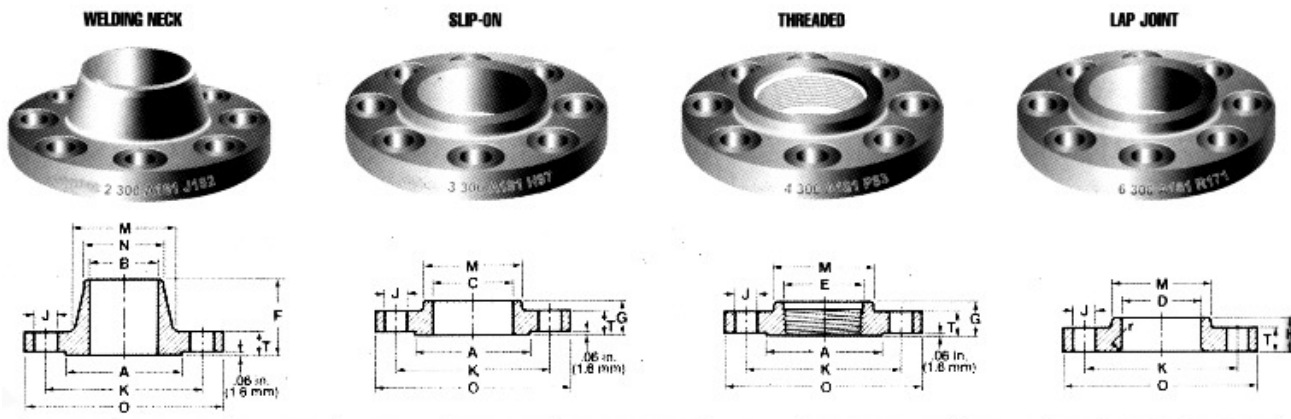
**CLASS 150 (PN 20)  
FLANGES  
FORGED STEEL**

ASTM A-105  
ANSI B16.5



NPS	DN	DRILLING		DEPTH OF SOCKET	DIAMETER OF HUB		LAP JOINT FILLET RADIUS	APPROXIMATE WEIGHT				
		NO. OF HOLES	DIA. OF HOLES		DIA. OF BOLT CIRCLE	AT BASE		AT CHAMFER	WELDING NECK	SLIP-ON THREADED & SOCKET WELDING <sup>1</sup>	BLIND	LAP JOINT
		J	K	L	M	N	P					
1/2	15	4	.52	2.38	.38	1.19	.84	12	2	1	1	1
3/4	20	4	.52	2.75	.44	1.50	1.05	12	2	2	2	2
1	25	4	.52	3.12	.50	1.94	1.32	12	3	2	2	2
1 1/4	32	4	.62	3.50	.56	2.31	1.66	19	3	5	3	3
1 1/2	40	4	.62	3.88	.62	2.66	1.90	25	4	3	4	3
2	50	4	.75	4.75	.69	3.06	2.00	31	6	5	5	5
2 1/2	65	4	.75	5.50	.75	3.56	2.00	31	8	7	7	7
3	80	4	.75	6.00	.81	4.25	3.50	38	10	8	9	8
3 1/2	90	8	.75	7.00	-	4.81	4.00	36	12	11	13	11
4	100	8	.75	7.50	-	5.31	4.50	44	15	13	17	13
5	125	8	.88	8.50	-	6.44	5.50	44	19	15	20	15
6	150	8	.88	9.50	-	7.56	6.50	50	24	19	25	19
8	200	8	.88	11.75	-	9.69	8.50	50	39	30	45	30
10	250	12	1.00	14.25	-	12.00	10.75	50	52	43	70	43
12	300	12	1.00	17.00	-	14.30	12.75	50	80	64	110	64
14	350	12	1.12	19.75	-	15.75	14.00	50	110	90	140	105
16	400	16	1.12	21.25	-	15.00	16.00	50	140	95	180	140
18	450	16	1.25	22.75	-	19.60	16.00	50	150	100	220	160
20	500	20	1.25	25.00	-	22.00	20.00	50	180	165	255	195
24	600	20	1.38	29.50	-	26.12	24.00	50	260	220	450	275
		20	1.50	35.00	-	33.00	30.00	50	350	290	600	350

POUNDS  
KILOGRAMS



NPS	DN	FLANGE OUTSIDE DIAMETER	FLANGE <sup>2</sup> THICKNESS MIN.	RAISED FACE DIA.	BORE				LENGTH THRU HU <sup>2</sup>		
					WELDING NECK & SOCKET WELDING	SLIP-ON & SOCKET WELD SOCKET MIN.	LAP JOINT MIN.	THREADED COUNTER-BORE MIN.	WELDING NECK	SLIP-ON THREADED & SOCK. WELD	LAP JOINT
		O	T	A	B <sup>1</sup>	C	D	E	F	G	H
1/2	15	3.75	.56	1.38	.62	.88	.90	.93	2.06	.88	.88
		95	14.5	34.9	15.8	22.2	22.9	23.5	52.4	22	22
3/4	20	4.62	.62	1.68	.82	1.09	1.11	1.14	2.25	1.00	1.00
		117	16.0	42.9	20.8	27.8	28.2	29.0	57.1	25	25
1	25	4.88	.69	2.00	1.06	1.36	1.38	1.41	2.44	1.06	1.06
		124	17.5	50.8	26.6	34.5	34.9	36.0	61.9	27	27
1 1/4	32	5.25	.75	2.60	1.38	1.70	1.72	1.75	2.56	1.06	1.06
		133	19.5	63.5	35.1	43.3	43.7	44.5	65.1	27	27
1 1/2	40	6.12	.81	2.88	1.61	1.95	1.97	1.99	2.68	1.19	1.19
		156	21.0	73.0	40.9	49.6	50.0	50.5	68.3	30	30
2	50	6.50	.88	3.62	2.07	2.41	2.46	2.50	2.75	1.31	1.31
		165	22.5	92.1	52.6	61.9	62.5	63.5	69.8	33	33
2 1/2	65	7.50	1.00	4.12	2.47	2.91	2.97	3.00	3.00	1.50	1.50
		191	25.5	104.8	62.7	74.6	75.4	76	76.2	38	38
3	80	8.25	1.12	5.00	3.07	3.57	3.60	3.63	3.12	1.69	1.69
		210	29.0	127.0	77.9	90.7	91.4	92	79.4	43	43
3 1/2	90	9.0	1.19	5.50	3.55	4.07	4.10	4.13	3.19	1.75	1.75
		229	30.5	139.7	90.1	103.4	104.1	105	81.0	44	44
4	100	10.0	1.25	6.19	4.03	4.57	4.60	4.63	3.38	1.88	1.88
		254	32.0	157.2	102.3	116.1	116.8	118	85.7	48	48
5	125	11.0	1.38	7.31	5.05	5.66	5.69	5.89	3.88	2.00	2.00
		279	35.0	185.7	128.2	143.7	144.5	145	98.4	51	51
6	150	12.5	1.44	8.50	6.07	6.72	6.75	6.75	3.88	2.06	2.06
		316	37.0	215.9	154.1	170.7	171.4	171	98.4	52	52
8	200	15.0	1.62	10.62	7.98	8.72	8.75	8.75	4.36	2.44	2.44
		381	41.5	269.9	202.7	221.5	222.2	222	111.1	62	62
10	250	17.5	1.88	12.75	10.02	10.88	10.92	10.88	4.62	2.62	3.75
		445	48.0	323.8	254.5	276.2	277.4	276	117.5	67	95
12	300	20.5	2.00	15.00	12.00	12.88	12.92	12.94	5.12	2.88	4.00
		520	51.0	381.0	304.8	327.0	328.2	329	130.2	73	102
14	350	23.0	2.12	16.25		14.14	14.18	14.19	5.62	3.00	4.38
		585	54.0	412.8	TO BE	359.2	360.2	360	142.9	76	111
16	400	25.5	2.25	18.50	SPECIFIED	16.16	16.19	16.19	5.75	3.25	4.75
		650	57.5	469.9	BY	410.4	411.2	411	146.0	83	121
18	450	28.0	2.38	21.00	BY	18.18	18.20	18.19	6.25	3.50	5.12
		710	60.5	533.4	PURCHASER	461.8	462.3	462	158.7	89	130
20	500	30.5	2.50	23.00	PURCHASER	20.20	20.25	20.19	6.38	3.75	5.50
		775	63.5	584.2		513.1	514.3	513	161.9	95	140
24	600	36.0	2.75	27.25		24.25	24.25	24.18	6.62	4.19	6.00
		915	70.0	692.2		615.9	615.9	614	168.3	106	152

<sup>1</sup>Socket Welding Flanges, sizes NPS 3-1/2 (DN 90) and larger are not covered by ANSI B16.5

<sup>2</sup>Includes .06" (1.6 mm) raised face.

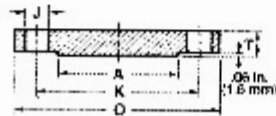
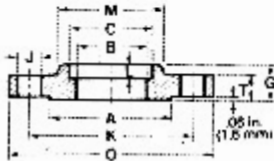
<sup>3</sup>These dimensions correspond to inside diameters of pipe as given in ANSI B16.10 for Standard Wall Pipe. Thickness of Standard Wall is the same as Schedule 40 in size NPS 10 (DN 250) and smaller.

INCHES
MILLIMETRES



# CLASS 300 (PN 50) FLANGES FORGED STEEL

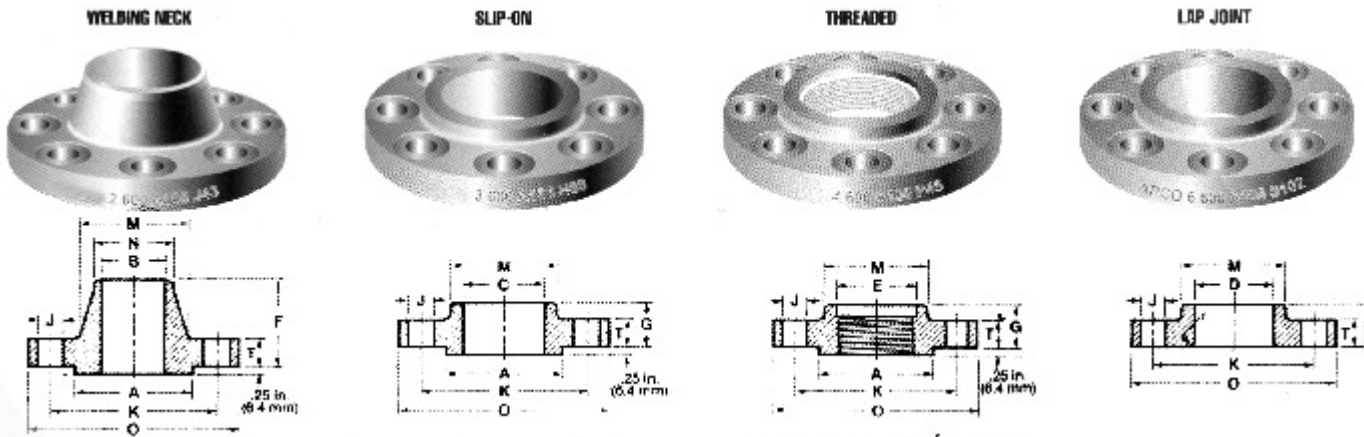
ASTM A-105  
ANSI B16.5



NPS	DN	DRILLING			DEPTH OF SOCKET	DIAMETER OF HUB		LAP JOINT FILLET RADIUS	APPROXIMATE WEIGHT			
		NO. OF HOLES	DIA. OF HOLES	DIA. OF BOLT CIRCLE		AT BASE	AT CHAMFER		WELDING NECK	SLIP-ON THREADED & SOCKET WELDING <sup>1</sup>	BLIND	LAP JOINT
		J	K	L	M	N	P					
1/2	15	4	.62	2.62	.38	1.50	.61	.12	2	2	2	2
3/4	20	4	.75	3.25	.41	1.88	1.05	.12	3	3	3	3
1	25	4	.75	3.50	.50	2.12	1.32	.12	4	3	3	3
1 1/4	32	4	.75	3.88	.56	2.50	1.66	.19	5	4	4	4
1 1/2	40	4	.88	4.50	.62	2.75	1.90	.25	7	6	6	6
2	50	8	.88	5.00	.69	3.31	2.38	.31	9	7	8	7
2 1/2	65	8	.88	5.88	.75	3.94	2.88	.31	12	10	12	10
3	80	8	.88	6.62	.81	4.62	3.50	.36	15	13	16	13
3 1/2	90	8	.88	7.25	-	5.25	4.00	.36	18	17	21	17
4	100	8	.88	7.88	-	5.75	4.50	.44	25	22	27	22
5	125	8	.88	8.75	-	7.00	5.56	.44	32	28	35	28
6	150	12	.88	10.62	-	8.12	6.63	.50	42	38	50	38
8	200	12	1.00	13.0	-	10.25	8.53	.50	67	58	81	58
10	250	16	1.12	15.25	-	12.62	10.75	.50	91	81	125	81
12	300	16	1.12	17.75	-	15.25	13.25	.50	115	100	140	100
14	350	20	1.25	20.25	-	17.75	15.75	.50	140	125	170	125
18	400	20	1.38	22.50	-	19.00	16.00	.50	180	165	210	165
18	450	24	1.38	24.75	-	21.00	18.00	.50	220	195	255	195
20	500	24	1.38	27.00	-	23.12	20.00	.50	250	225	290	225
24	600	24	1.62	32.00	-	27.62	24.00	.50	320	285	370	285
24	600	42	1.62	32.00	-	27.62	24.00	.50	580	475	700	475

POUNDS  
KILOGRAMS





NPS	DN	FLANGE OUTSIDE DIAMETER	FLANGE <sup>1</sup> THICKNESS MIN.	RAISED FACE DIA.	BORE				LENGTH THRU HU <sup>2</sup>		
					WELDING NECK & SOCKET WELDING	SLIP-ON & SOCKET WELD SOCKET MIN.	LAP JOINT MIN.	THREADED COUNTERBORE MIN.	WELDING NECK	SLIP-ON THREADED & SOCK. WELD	LAP JOINT
		B	T	A	B	C	D	E	F	G	H
1/2	15	3.75	.56	1.36		.86	.90	.95	2.06	.88	.88
3/4	20	4.52	.62	1.69		1.09	1.11	1.14	2.25	1.00	1.0
1	25	4.85	.69	2.0		1.36	1.38	1.41	2.44	1.06	1.06
1 1/4	32	5.25	.81	2.5	Tube	1.70	1.72	1.75	2.62	1.12	1.12
1 1/2	40	6.12	.88	2.88	specified	1.95	1.97	1.99	2.75	1.25	1.25
2	50	6.5	1.0	3.62	by	2.44	2.46	2.50	2.88	1.44	1.44
2 1/2	65	7.5	1.12	4.12	purchaser	2.94	2.97	3.00	3.12	1.62	1.62
3	80	8.25	1.25	5.0		3.57	3.60	3.63	3.25	1.81	1.81
3 1/2	90	9.0	1.38	5.5		4.07	4.10	4.13	3.38	1.94	1.94
4	100	10.75	1.5	6.12		4.57	4.60	4.63	4.0	2.12	2.12
5	125	13.0	1.75	7.31		5.66	5.69	5.69	4.5	2.38	2.38
6	150	14.0	1.88	8.5		6.72	6.75	6.75	4.82	2.62	2.62
8	200	16.5	2.18	10.62		8.72	8.75	8.75	5.25	3.0	3.0
10	250	20.0	2.5	12.75		10.98	10.92	10.86	6.0	3.38	4.38
12	300	22.0	2.62	15.0		12.55	12.52	12.54	6.12	3.62	4.62
14	350	23.75	2.75	16.25		14.14	14.18	14.19	6.5	3.82	5.0
16	400	27.0	3.0	18.5		16.16	16.19	16.19	7.0	4.19	5.5
18	450	29.25	3.25	21.0		18.18	18.20	18.19	7.25	4.62	6.0
20	500	32.0	3.5	23.0		20.20	20.25	20.19	7.5	5.0	6.5
24	600	37.0	4.00	27.25		24.25	24.25	24.19	8.0	5.6	7.25

<sup>1</sup> Socket Welding Flanges, size NPS 3 1/2 (DN 90) and larger are not covered by ANSI 316.5

<sup>2</sup> Does not include .25" (6.4 mm) raised face.

INCHES  
MILLIMETRES

**SOCKET WELDING**

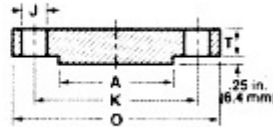
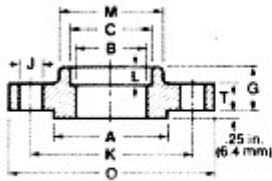


**BLIND**



## CLASS 600 (PN 100) FLANGES FORGED STEEL

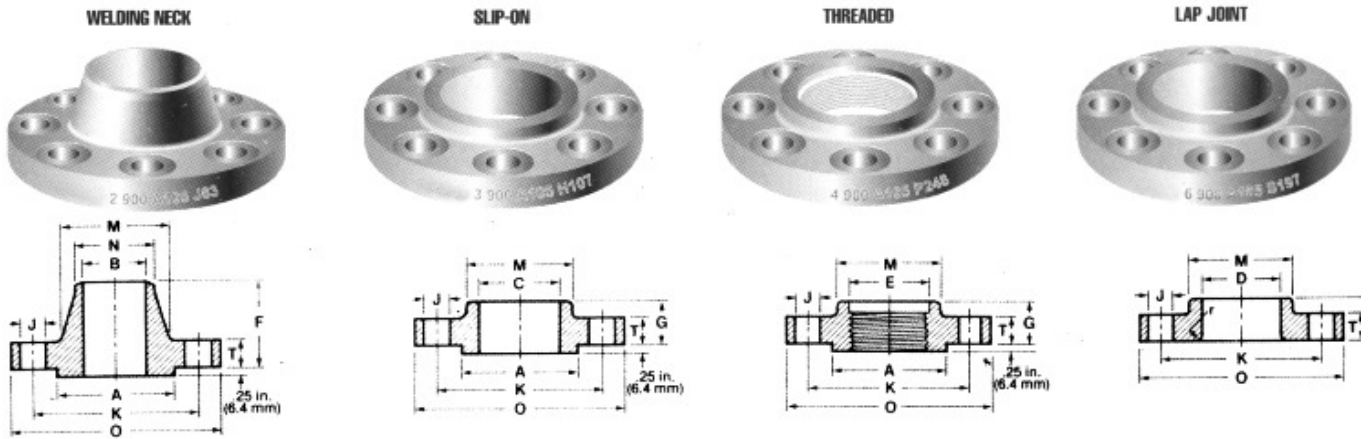
ASTM A-105  
ANSI B16.5



NPS	DN	NO. OF HOLES	DRILLING		DEPTH OF SOCKET	DIAMETER OF HUB		LAP JOINT FILLET RADIUS	APPROXIMATE WEIGHT			
			DIA. OF HOLES	DIA. OF BOLT CIRCLE		AT BASE	AT CHAMFER		WELDING NECK	SLIP-ON THREADED & SOCKET WELDING <sup>1</sup>	BLIND	LAP JOINT
			J	K	L	M	N	P				
1/2	15	4	.62	2.62	.38	1.5	.84	.12	2	2	2	2
		4	16	66.7	10	38.1	21.4	3	0.9	0.9	0.9	0.9
3/4	20	4	.75	3.25	.44	1.88	1.05	.12	4	3	3	3
		4	20	82.5	11	47.6	26.6	3	1.8	1.4	1.4	1.4
1	25	4	.75	3.5	.50	2.12	1.32	.12	4	4	4	4
		4	20	88.9	13	54.0	33.5	3	1.8	1.8	1.8	1.8
1 1/4	32	4	.75	3.88	.56	2.5	1.66	.19	6	5	5	5
		4	20	98.4	14	63.9	42.1	5	2.7	2.3	2.3	2.3
1 1/2	40	4	.99	4.5	.62	2.75	1.90	.25	8	7	7	7
		4	23	114.3	16	69.8	48.3	8	3.6	3.2	3.6	3.2
2	50	8	.75	5.0	.69	3.31	2.38	.31	12	9	10	9
		8	20	127.0	17	84.1	60.3	8	5.4	4.1	4.5	4.1
2 1/2	65	8	.88	5.88	.75	3.94	2.88	.31	18	13	15	12
		8	23	149.2	19	100.0	73.0	8	8.2	5.9	6.8	5.4
3	80	8	.88	6.62	.81	4.62	3.50	.38	23	16	20	15
		8	23	168.3	21	117.5	88.9	10	10.4	7.3	9.1	6.8
3 1/2	90	8	1.0	7.25	-	5.25	4.00	.38	26	21	29	20
		8	26	184.1	-	133.3	101.6	10	11.8	9.5	13.2	9.1
4	100	8	1.0	8.5	-	6.0	4.50	.44	42	37	41	36
		8	26	215.9	-	152.4	114.3	11	19.0	16.8	18.6	16.3
5	125	8	1.12	10.5	-	7.44	5.56	.44	68	63	68	61
		8	29	266.7	-	188.9	141.3	11	31.0	28.8	30.8	27.7
6	150	12	1.12	11.5	-	8.75	6.63	.50	81	80	86	78
		12	29	292.1	-	222.2	168.3	13	38.7	36.3	39.0	35.4
8	200	12	1.25	13.75	-	10.75	8.83	.50	120	115	140	110
		12	32	349.2	-	273.0	219.1	13	54.4	52.2	63.5	48.9
10	250	16	1.38	17.0	-	13.5	10.75	.50	190	170	230	170
		16	35	431.8	-	342.9	278.0	18	86.2	77.1	104	77.1
12	300	20	1.38	19.25	-	15.75	12.75	.50	225	200	295	200
		20	35	488.9	-	400.0	328.8	13	102	90.7	134	90.7
14	350	20	1.50	20.75	-	17.0	14.0	.50	280	230	355	250
		20	39	527.0	-	431.8	355.6	13	127	104	161	113
18	400	20	1.62	23.75	-	19.5	16.0	.50	390	330	495	365
		20	42	603.2	-	495.2	408.4	13	177	150	225	166
18	450	20	1.75	25.75	-	21.5	18.0	.50	475	400	630	435
		20	45	654.0	-	546.1	457.2	13	215	181	286	197
20	500	24	1.75	28.5	-	24.0	20.0	.50	590	510	810	570
		24	45	729.9	-	609.6	508.0	13	268	231	367	259
24	600	24	2.0	33.0	-	28.26	24.0	.50	830	730	1250	810
		24	51	838.2	-	717.5	609.6	13	376	331	567	367

**POUNDS**  
**KILOGRAMS**





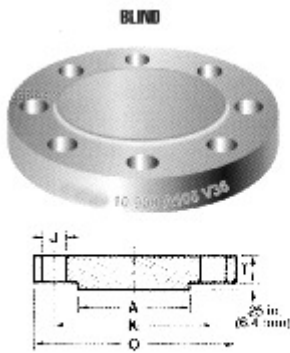
For sizes NPS 1/2 (DN 15) through NPS 2 1/2 (DN 65) use Class 1500 (PN 250) flanges.<sup>1</sup>

NPS	FLANGE OUTSIDE DIAMETER	FLANGE <sup>2</sup> THICKNESS MIN.	RAISED FACE DIA.	BORE				LENGTH THRU HU <sup>2</sup>		
				WELDING NECK	SLIP-ON MIN.	LAP JOINT MIN.	THREADED COUNTERBORE MIN.	WELDING NECK	SLIP-ON THREADED	LAP JOINT
DN	O	T	A	B	C	D	E	F	G	H
3	9.50	1.50	5.00		3.57	3.60	3.63	4.00	2.12	2.12
80	241	38.5	127.0		90.7	91.4	92	101.6	54	54
4	11.50	1.75	6.19		4.57	4.60	4.63	4.50	2.75	2.75
100	292	44.5	157.2		116.1	116.8	118	114.3	70	70
5	13.75	2.0	7.31		5.66	5.69	5.69	5.00	3.12	3.12
125	349	51.0	185.7		143.7	144.5	145	127.0	79	79
6	15.00	2.19	8.50	To be	6.72	6.75	6.75	5.50	3.38	3.38
150	381	56.0	215.9		170.7	171.4	171	139.7	86	86
8	18.50	2.5	10.62	specified	8.72	8.75	8.75	6.38	4.00	4.50
200	470	63.5	269.9		221.5	222.2	222	161.9	102	114
10	21.50	2.75	12.75	by	10.88	10.92	10.88	7.25	4.25	5.00
250	545	70.0	323.8		276.2	277.4	276	184.2	108	127
12	24.00	3.12	15.00	purchaser	12.88	12.92	12.94	7.88	4.62	5.62
300	610	79.5	381.0		327.0	328.2	329	200.0	117	143
14	25.25	3.38	16.25		14.14	14.18	14.19	8.38	5.12	6.12
350	640	86.0	412.8		359.2	360.2	360	212.7	130	156
16	27.75	3.5	18.50		16.16	16.19	16.19	8.50	5.25	6.50
400	705	89.0	469.9		410.4	411.2	411	215.9	133	165
18	31.00	4.0	21.00		18.18	18.20	18.19	9.00	6.00	7.50
450	785	102.0	533.4		461.8	462.3	462	228.8	152	191
20	33.75	4.25	23.00		20.20	20.25	20.19	9.75	6.25	8.25
500	855	108.0	584.2		513.1	514.3	513	247.6	159	210
24	41.00	5.5	27.25		24.25	24.25	24.19	11.50	8.00	10.50
600	1040	140.0	692.2		615.9	615.9	614	292.1	203	267

<sup>1</sup> Including SOCKET WELDING FLANGES.

<sup>2</sup> Does not include .25" (6.4 mm) raised face.

INCHES
MILLIMETRES



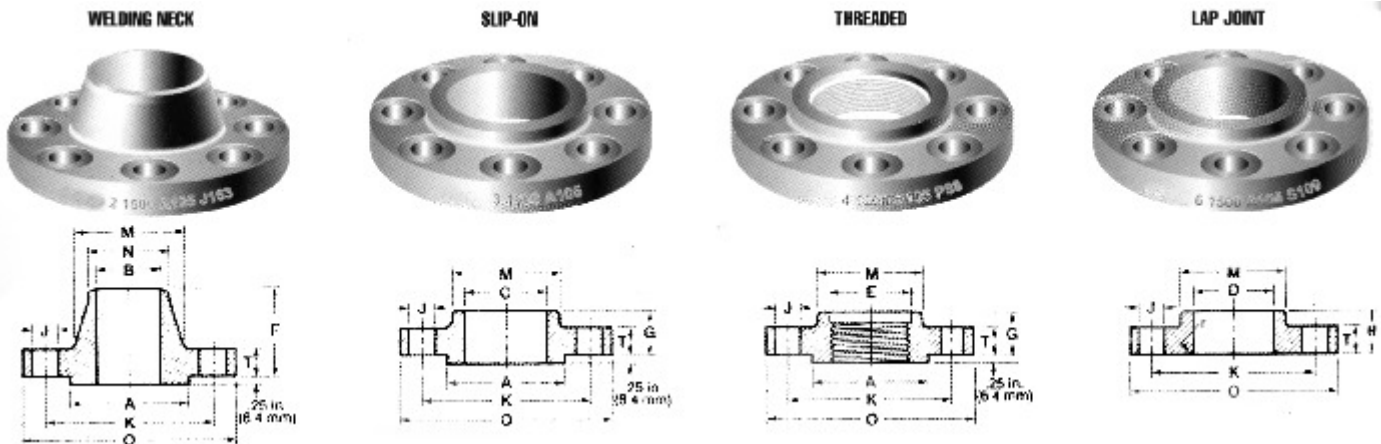
**CLASS 900 (PN 160)  
FLANGES  
FORGED STEEL**

ASTM A-105  
ANSI B16.5

For sizes NPS 1/2 (DN 15) through NPS 2 1/2 (DN 65) use Class 1500 (PN 250) flanges.

NPS DN	DRILLING			DIAMETER OF HUB		LAP JOINT FILLET RADIUS P	APPROXIMATE WEIGHT			
	NO. OF HOLES	DIA. OF HOLES J	DIA. OF BOLT CIRCLE K	AT BASE M	AT CHAMFER N		WELDING NECK	SLIP-ON THREADED	BLIND	LAP JOINT
3 80	8	1.00	7.50	5.00	3.50	.38	31	31	31	47
4 100	8	1.25	9.25	6.25	4.50	.44	51	53	54	51
5 125	8	1.38	11.00	7.50	5.56	.44	86	83	87	81
6 150	12	1.25	12.50	9.25	6.63	.50	110	110	115	105
8 200	12	1.50	15.50	11.75	8.63	.50	175	170	200	180
10 250	16	1.50	18.50	14.50	10.75	.50	260	245	290	275
12 300	20	1.50	21.00	16.50	12.75	.50	325	325	415	370
14 350	20	1.62	22.00	17.75	14.00	.50	400	400	520	415
16 400	20	1.75	24.25	20.00	16.00	.50	495	425	600	465
18 450	20	2.00	27.00	22.25	18.00	.50	680	600	850	650
20 500	20	2.12	29.50	24.50	20.00	.50	830	730	1075	810
24 600	20	2.62	35.50	29.5	24.00	.50	1500	1400	2025	1550

**POUNDS**  
**KILOGRAMS**



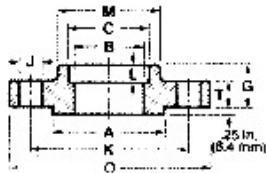
NPS	DN	FLANGE OUTSIDE DIAMETER	FLANGE THICKNESS MIN.	RAISED FACE DIA.	BORE				LENGTH THRU HUB <sup>2</sup>		
					WELDING NECK & SOCKET WELDING	SLIP-ON & SOCK. WELD SOCKET MIN.	LAP JOINT MIN.	THREADED COUNTERBORE MIN.	WELDING NECK	SLIP-ON, THREADED, SOCKET WELDING	LAP JOINT
		D	T	A	B	C	D	E	F	G	H
1/2	15	4.75	.86	1.38		0.88	.90	.93	2.38	1.25	1.25
3/4	20	5.12	1.00	1.69		1.09	1.11	1.14	2.75	1.38	1.38
1	25	5.88	1.12	2.00		1.36	1.38	1.41	2.88	1.62	1.62
1 1/4	32	6.25	1.12	2.50		1.70	1.72	1.75	2.88	1.62	1.62
1 1/2	40	7.00	1.25	2.88		1.95	1.97	1.99	3.25	1.75	1.75
2	50	8.50	1.50	3.62	To be	2.44	2.46	2.50	4.00	2.25	2.25
2 1/2	65	9.62	1.62	4.12	specified	2.94	2.97	3.00	4.12	2.50	2.50
3	80	10.50	1.88	5.00	by	-	3.60	3.63	4.62	2.88	2.88
4	100	12.25	2.12	6.19	purchasee	-	4.80	4.83	4.88	3.56	3.56
5	125	14.75	2.88	7.31		-	5.69	5.69	6.12	4.12	4.12
6	150	15.60	3.25	8.50		-	6.75	6.75	6.75	4.69	4.69
8	200	19.00	3.62	10-62		-	8.75	8.75	8.38	5.62	5.62
10	250	23.00	4.25	12.75		-	10.92	10.86	10.00	6.25	7.00
12	300	26.50	4.88	15.00		-	12.92	12.94	11.12	7.12	8.82
14	350	29.50	5.25	16-25		-	14.18	-	11.75	-	9.50
16	400	32.60	6.75	18.50		-	16.19	-	12.25	-	10.25
18	450	36.00	6.38	21.00		-	18.20	-	12.88	-	10.88
20	500	38.75	7.00	23.00		-	20.26	-	14.00	-	11.50
24	600	46.00	8.00	27.25		-	24.25	-	16.00	-	13.00
		1170	203.5	692.2		-	615.9	-	406.4	-	330

<sup>1</sup> Socket Welding and Slip-on Flanges size NPS 3 (DN 80) and larger are not covered by ANSI B16.5

<sup>2</sup> Does not include .25" (6.4 mm) raised face.

INCHES  
MILLIMETERS



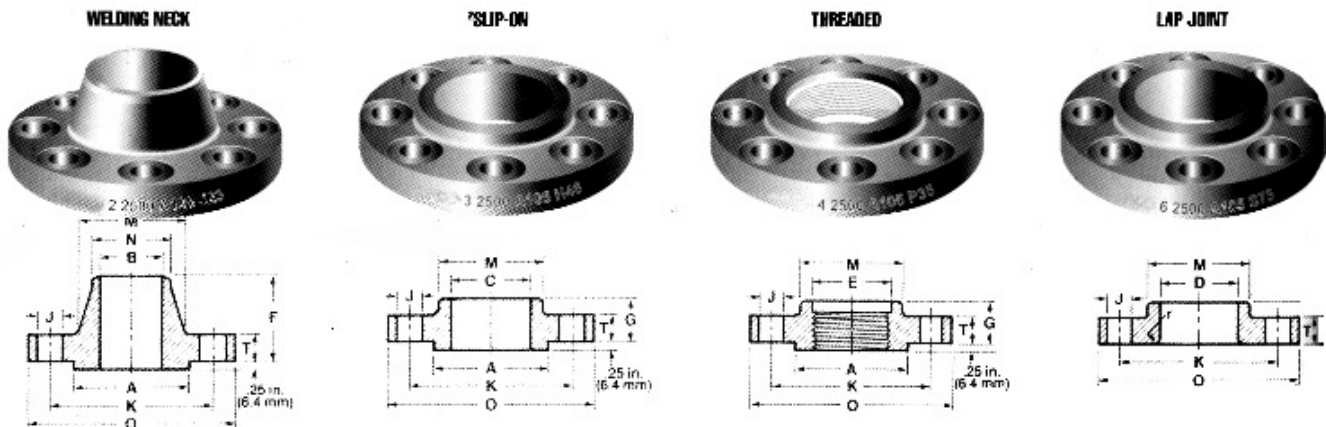


**CLASS 1500 (PN 250)  
FLANGES  
FORGED STEEL**

ASTM A-105  
ANSI B16.5

NPS	DN	DRILLING			DEPTH OF SOCKET	DIAMETER OF HUB		LAP JOINT FILLET RADIUS	APPROXIMATE WEIGHT			
		NO. OF HOLES	DIA. OF HOLES	DIA. OF BOLT CIRCLE		AT BASE	AT CHAMFER		WELDING NECK	'SLIP-ON THREADED & 'SOCKET WELDING	BLIND	LAP JOINT
		J	K	L	M	N	P					
1/2	15	4	.88	3.25	.38	1.50	.84	.12	5	4	4	4
3/4	20	4	.88	3.50	.44	1.75	1.05	.12	6	5	6	5
1	25	4	1.00	4.00	.50	2.00	1.32	.12	9	8	8	8
1 1/4	32	4	1.00	4.38	.56	2.50	1.65	.19	10	9	9	9
1 1/2	40	4	1.12	4.98	.62	2.75	1.90	.20	13	12	13	12
2	50	6	1.00	6.50	.68	4.12	2.38	.31	25	25	25	25
2 1/2	65	8	1.12	7.50	.75	4.88	2.88	.31	36	36	36	36
3	80	8	1.25	8.00	-	5.25	3.50	.38	48	48	48	47
4	100	8	1.38	9.50	-	6.38	4.50	.44	73	73	73	75
5	125	8	1.62	11.50	-	7.75	5.68	.44	130	130	140	140
6	150	12	1.50	12.50	-	9.00	6.63	.50	165	165	180	170
8	200	12	1.75	15.50	-	11.50	8.63	.50	275	280	300	285
10	250	12	2.00	19.00	-	14.50	10.75	.50	455	435	510	485
12	300	16	2.12	22.50	-	17.75	12.75	.50	690	680	690	690
14	350	16	2.38	25.00	-	19.50	14.00	.50	940	-	975	890
16	400	16	2.62	27.75	-	21.75	16.00	.50	1250	-	1300	1150
18	450	16	2.88	30.50	-	23.50	18.00	.50	1625	-	1750	1475
20	500	16	3.12	32.75	-	25.25	20.00	.50	2050	-	2225	1775
24	600	16	3.62	38.00	-	30.00	24.00	.50	3325	-	3625	2875
		16	3.2	390.6	-	782.0	609.6	13	1510	-	1644	1325

**POUNDS**  
**KILOGRAMS**



NPS	DN	FLANGE OUTSIDE DIAMETER	FLANGE <sup>1</sup> THICKNESS	RAISED FACE DIA.	BORE				LENGTH THRU HUB <sup>1</sup>		
					WELDING NECK & SOCKET <sup>2</sup> WELDING	SLIP-ON <sup>2</sup> & SOCKET WELD <sup>2</sup> MIN.	LAP JOINT MIN.	THREADED COUNTERBORE MIN.	WELDING NECK	SLIP-ON <sup>2</sup> THREADED SOCKET <sup>2</sup> WELDING	LAP JOINT
		Ø	T	A	B	C	D	E	F	G	H
1/2	15	5.25	1.19	1.38		0.88	.90	0.93	2.88	1.56	1.56
		133	30.5	34.9		22.2	22.9	23.5	73.0	40	40
3/4	20	5.50	1.25	1.69		1.09	1.11	1.14	3.12	1.99	1.99
		140	32.0	42.9		27.8	28.2	29.0	79.4	43	43
1	25	6.25	1.38	2.00		1.36	1.38	1.41	3.50	1.88	1.88
		150	35.0	50.8		34.5	34.9	36.0	88.9	40	48
1 1/4	32	7.25	1.50	2.50	To be	1.70	1.72	1.75	3.75	2.06	2.06
		184	38.5	63.5		43.3	43.7	44.5	95.2	52	52
1 1/2	40	8.00	1.75	2.88	specified	1.95	1.97	1.99	4.38	2.38	2.38
		203	44.5	73.0		49.6	50.0	50.5	111.4	60	60
2	50	9.25	2.00	3.62	by	2.44	2.46	2.50	5.00	2.75	2.75
		235	51.0	92.1		61.9	62.5	63.5	127.0	70	70
2 1/2	65	10.50	2.25	4.12	purchaser	2.94	2.97	3.00	5.62	3.12	3.12
		287	57.5	104.8		74.6	75.4	76	142.9	79	79
3	80	12.00	2.62	5.00		3.57	3.60	3.63	6.62	3.62	3.62
		305	67.0	127.0		90.7	91.4	92	168.2	92	92
4	100	14.00	3.00	6.19		4.57	4.60	4.63	7.50	4.25	4.25
		356	76.5	157.2		116.1	116.8	118	190.5	108	108
5	125	16.50	3.62	7.31		5.68	5.69	5.69	9.00	5.12	5.12
		419	92.5	185.7		143.7	144.5	145	228.6	130	130
6	150	19.00	4.25	8.50		6.72	6.75	6.75	10.75	6.0	6.0
		483	108.0	215.9		170.7	171.4	171	273.0	152	152
8	200	21.75	5.00	10.62		8.72	8.75	8.75	12.50	7.0	7.0
		552	127.0	269.9		221.6	222.2	222	317.5	178	178
10	250	26.50	6.50	12.75		10.88	10.92	10.86	16.50	9.0	9.0
		675	165.5	323.8		276.2	277.4	276	419.4	229	229
12	300	30.00	7.25	15.00		12.88	12.92	12.94	18.25	10.0	10.0
		760	184.5	381.0		327.0	328.2	329	463.6	254	254

<sup>1</sup> Dimensions do not include .25" (6.4 mm) raised face.  
<sup>2</sup> Class 2500 (PN 400) Socket Welding and Slip-on Flanges not covered by ANSI B16.5

## Reducing Flanges ANSI B16.5

Hub dimensions shall be at least as large as those of the standard flanges of the size to which the reduction is being made, except that flanges reduced to a size smaller than those shown in the accompanying table may be used without hubs.

For threaded flanges, tapped smaller than the reduced size in the table. Blind Flanges may be used.

Flange thickness, outside diameter, drilling template and facing dimensions, shall be the same as those of a standard flange of the nominal pipe size from which the reduction is being made.

Reducing flanges are specified by giving firstly the size from which the reduction is made, followed by the reduced size.

Example:

NPS 6 x 4 Class 300 reducing threaded flange. (DN 150 x 100. PN 50 reducing threaded flange).



**SOCKET WELDING**



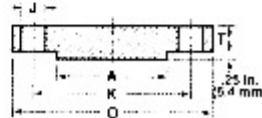
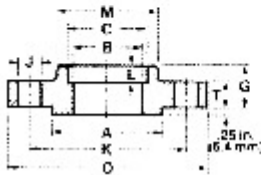
**BLIND**



## CLASS 2500 (PN 400) FLANGES\* FORGED STEEL

ASTMA-105

ANSI B16.5



NPS DN	DRILLING			DEPTH OF SOCKET L	DIAMETER OF HUB		LAP JOINT FILLET RADIUS P	APPROXIMATE WEIGHT			
	NO. OF HOLES	DIA. OF HOLES J	DIA. OF BOLT CIRCLE K		AT BASE M	AT CHAMFER N		WELDING NECK	SLIP-ON THREADED & SOCKET WELDING	BLIND	LAP JOINT
1/2 15	4	.85	3.50	.38	1.09	.84	.12	7	7	7	7
3/4 20	4	.85	3.75	.44	2.00	1.05	.12	8	8	8	8
1 25	4	1.00	4.25	.50	2.25	1.32	.12	12	11	11	11
1 1/4 32	4	1.12	5.12	.58	2.88	1.66	.19	17	16	17	16
1 1/2 40	4	1.25	5.75	.62	3.12	1.90	.25	25	22	23	22
2 50	8	1.12	6.75	.69	3.75	2.38	.31	42	39	39	37
2 1/2 65	8	1.25	7.75	.75	4.50	2.88	.31	52	55	56	53
3 80	8	1.38	9.00	-	5.25	3.50	.35	84	83	86	80
4 100	8	1.62	10.75	-	6.50	4.50	.44	145	125	135	120
5 125	8	1.88	12.75	-	8.00	5.58	.44	245	210	225	206
6 150	8	2.12	14.50	-	9.25	6.63	.50	380	325	345	315
8 200	12	2.12	17.25	-	12.00	8.63	.50	580	485	530	470
10 250	12	2.62	21.25	-	14.75	10.75	.50	1075	930	1025	900
12 300	12	2.88	24.38	-	17.38	12.75	.50	1525	1100	1300	1100
		74	619.1	-	441.3	323.8	.18	692	499	590	499

\*Class 2500 (PN 400) Socket Welding and Slip-on Flanges are not covered by ANSI B 16.5

## CLASS 150 - 2500 (PN 20 - 400)

Nominal Pipe Size	DN	Smallest Size of Reducing Outlet Requiring Hub Flanges
1/2	25	1/2
1/2	32	1/2
1/2	40	1/2
2	50	1
2 1/2	65	1 1/2
3	80	1 1/2

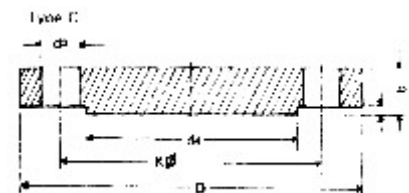
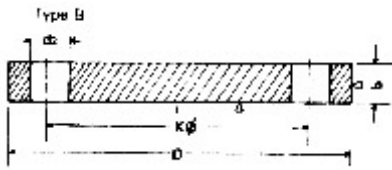
Nominal Pipe Size	DN	Smallest Size of Reducing Outlet Requiring Hub Flanges
3 1/2	90	1 1/2
4	100	1 1/2
5	125	1 1/2
6	150	2 1/2
8	200	3 1/2
10	250	3 1/2

Nominal Pipe Size	DN	Smallest Size of Reducing Outlet Requiring Hub Flanges
12	300	2 1/2
14	350	3 1/2
16	400	4
18	450	4
20	500	4
24	600	4

**POUNDS**  
**KILOGRAMS**

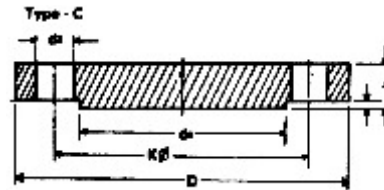
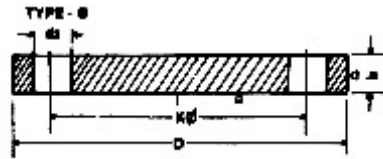
Reducing Flanges are generally supplied as Slip-on or Threaded, however Reducing Welding Neck Flanges are available by special order.





## DIN 2527

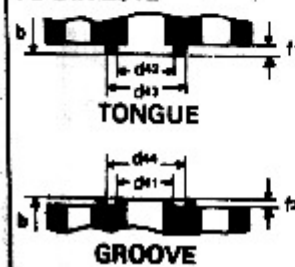
	KW	D	Flange		Raised Face		Number	Bolts		Dia. of Bolt Hole	Weight of one Flange (7.85 kg/dm <sup>3</sup> )	
			b	k	d <sub>1</sub>	d <sub>2</sub>					Type-B	Type-C
<b>ND-6</b>	10	75	12	50	35	2	4	M 10	--	11.5	0.38	0.33
	15	80	12	55	40	2	4	M 10	--	11.5	0.44	0.38
	20	90	14	65	50	2	4	M 10	--	11.5	0.65	0.59
	25	100	14	75	60	2	4	M 10	--	11.5	0.82	0.74
	32	120	14	90	70	2	4	M 12	(1/2")	14	1.17	1.07
	40	130	14	100	80	3	4	M 12	(1/2")	14	1.39	1.21
	50	140	14	110	90	3	4	M 12	(1/2")	14	1.62	1.43
	65	160	14	130	110	3	4	M 12	(1/2")	14	2.44	2.21
	80	190	16	150	128	3	4	M 16	(1/2")	18	3.43	3.09
	100	210	16	170	148	3	4	M 16	(1/2")	18	4.76	4.37
	125	240	18	200	173	3	8	M 16	(1/2")	18	6.11	5.88
	150	265	18	225	202	3	8	M 16	(1/2")	18	7.51	7.02
	(175)	295	20	255	232	3	8	M 16	(1/2")	18	10.4	9.85
	200	320	20	280	258	3	8	M 16	(1/2")	18	12.3	11.7
	250	375	22	335	312	3	12	M 16	(1/2")	18	18.3	17.6
300	440	22	395	366	4	12	M 20	(1/2")	23	25.3	24.0	
350	490	22	445	415	4	12	M 20	(1/2")	23	31.6	30.1	
400	540	22	495	465	4	16	M 20	(1/2")	23	38.4	36.4	
500	645	24	600	570	4	20	M 20	(1/2")	23	58.4	58.1	
<b>ND-10</b> Note from 10 mm to 175 mm see ND-16	200	340	24	295	268	3	8	M 20	(1/2")	23	18.5	15.6
	250	395	26	350	320	3	12	M 20	(1/2")	23	24.0	23.1
	300	445	26	400	370	4	12	M 20	(1/2")	23	30.3	29.4
	350	505	26	460	430	4	16	M 20	(1/2")	23	40.6	38.8
	400	565	26	515	482	4	16	M 24	(1/2")	27	49.4	47.5
	500	670	28	620	585	4	20	M 24	(1/2")	27	75.0	72.7
<b>ND-16</b> Note: For DIN 2527 ND-10 4 Holes	10	90	14	60	40	2	4	M 12	(1/2")	14	0.63	0.56
	15	95	14	65	45	2	4	M 12	(1/2")	14	0.72	0.64
	20	105	16	75	58	2	4	M 12	(1/2")	14	1.01	0.93
	25	115	16	85	68	2	4	M 12	(1/2")	14	1.23	1.13
	32	140	16	100	78	2	4	M 16	(1/2")	18	1.80	1.66
	40	150	16	110	88	3	4	M 16	(1/2")	18	2.09	1.85
	50	165	18	125	102	3	4	M 16	(1/2")	18	2.86	2.59
	65	185	18	145	122	3	4	M 16	(1/2")	18	3.66	3.33
	80	200	20	160	138	3	4/8	M 16	(1/2")	18	4.77	4.34
	100	220	20	180	158	3	6	M 16	(1/2")	18	5.65	5.20
	125	250	22	210	188	3	6	M 16	(1/2")	18	8.42	7.67
	150	285	22	240	212	3	8	M 20	(1/2")	23	10.4	8.85
	(175)	315	24	270	242	3	6	M 20	(1/2")	23	14.0	13.5
	200	340	24	295	260	3	12	M 20	(1/2")	23	16.1	15.6
	250	405	26	355	320	3	12	M 24	(1/2")	27	24.9	23.0
300	460	28	410	378	4	12	M 24	(1/2")	27	35.1	33.6	
350	520	30	470	438	4	16	M 24	(1/2")	27	47.8	46.2	
400	580	32	525	490	4	16	M 27	1"	30	63.5	61.5	
500	715	34	630	610	4	20	M 30	(1 1/2")	33	102	99.5	



### DIN 2527

	NW	D	Flange		Raised Face Bolt Hole		Number	Bolts	Dia. of Bolt Hole $d_2$	Weight of one Flange (7.85 kg/dm <sup>3</sup> )	
			b	k	$d_4$	1				Type-B	Type-C
<b>ND-25</b> Note: from 10 mm to 150 mm see ND-40	(175)	330	28	280	248	3	12	M 24 (3/4")	27	17.3	16.5
	200	360	30	310	278	3	12	M 24 (3/4")	27	22.3	21.5
	250	425	32	370	335	3	12	M 27 (1")	30	33.5	32.5
	300	485	34	430	395	4	16	M 27 (1")	30	46.3	44.7
	350	555	38	490	450	4	16	M 30 (1 1/8")	33	66.0	65.9
	400	620	40	550	505	4	16	M 33 (1 3/8")	36	89.7	87.0
	500	730	44	660	615	4	20	M 33 (1 3/8")	36	138	134
<b>ND-40</b>	10	90	16	60	40	2	4	M 12 (1/2")	14	0.72	0.62
	15	95	16	65	45	2	4	M 12 (1/2")	14	0.81	0.74
	20	105	18	75	58	2	4	M 12 (1/2")	14	1.24	1.05
	25	115	18	85	68	2	4	M 12 (1/2")	14	1.36	1.31
	32	140	18	100	78	2	4	M 16 (5/8")	18	2.03	1.82
	40	150	18	110	88	3	4	M 16 (5/8")	18	2.35	2.11
	50	165	20	125	102	3	4	M 16 (5/8")	18	3.20	2.91
	65	185	22	145	122	3	8	M 16 (5/8")	18	4.29	4.13
	80	200	24	160	138	3	8	M 16 (5/8")	18	5.88	5.21
	100	235	24	190	162	3	8	M 20 (3/4")	23	7.54	7.08
	125	270	26	220	188	3	8	M 24 (1")	27	10.8	10.4
	150	300	28	250	218	3	8	M 24 (1")	27	14.5	13.9
	175	350	32	295	260	3	12	M 27 (1")	30	22.1	21.3
	200	375	34	320	285	3	12	M 27 (1")	30	27.2	26.2
	250	450	38	385	345	3	12	M 30 (1 1/8")	33	43.8	43.1
	300	515	42	450	410	4	16	M 30 (1 1/8")	33	63.3	62.2
	350	580	46	510	465	4	16	M 33 (1 3/8")	36	89.5	87.2
	400	660	50	585	535	4	16	M 36 (1 3/8")	39	127	124
500	775	52	670	615	4	20	M 39 (1 1/2")	42	172	168	

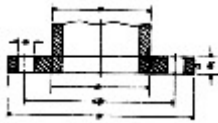
### FLANGE FACINGS TONGUE AND GROOVE, NOMINAL PRESSURE 10 TO 100 ACCORDING TO DIN 2512



Nominal Pipe Size	Tongue			Groove			Nominal Pipe Size	Tongue			Groove		
	$d_{42}$ +0.5	$d_{43}$ -0.5	$f_1$ -0.5	$d_{41}$ -0.5	$d_{44}$ +0.5	$f_2$ -0.5		$d_{42}$ +0.5	$d_{43}$ -0.5	$f_1$ +0.5	$d_{41}$ -0.5	$d_{44}$ +0.5	$f_2$ -0.5
10	24	34	4	23	35	3	175	213	233	4.5	212	234	2.5
15	29	39	4	28	40	3	200	239	259	4.5	238	260	3.5
20	36	50	4	35	51	3	250	292	312	4.5	291	313	3.5
25	43	57	4	42	58	3	300	343	363	4.5	342	364	3.5
32	51	65	4	50	66	3	350	395	421	5	394	422	4
40	61	75	4	60	76	3	400	447	473	5	446	474	4
50	73	87	4	72	88	3	500	549	575	5	548	576	4
65	95	109	4	94	110	3	600	649	675	5	648	676	4
80	106	120	4	105	121	3	700	751	777	5	750	778	4
100	129	149	4.5	128	150	3.5	800	856	882	5	855	883	4
125	155	175	4.5	154	176	3.5	900	961	987	5	960	988	4
150	183	203	4.5	182	204	3.5	1000	1061	1091	6	1060	1092	5

**DIN 2576**

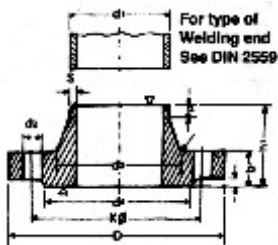
**Flanges, Slip-on type for British or Welding nominal pressure 10**



Pipe		Flange				Range				Weight of one Flange 7.85 kg/dm <sup>3</sup> /kg
NW	d1	ds	D	b1	k	Number	Thread	d2		
10	14 17.2*)	14.5 17.7	90	14	60	4	M 12 (1/2")	14	0.613 0.605	
15	20 21.3*)	20.5 21.8	95	14	65	4	M 12 (1/2")	14	0.675 0.669	
20	25 26.9*)	25.5 27.4	105	16	75	4	M 12 (1/2")	14	0.947 0.936	
25	30 33.7*)	30.5 34.2	115	16	85	4	M 12 (1/2")	14	1.14 1.11	
32	38 42.4*)	38.5 42.9	140	16	100	4	M 16 (3/4")	18	1.66 1.62	
40	44.5 48.3*)	45 48.8	150	16	110	4	M 16 (3/4")	18	1.89 1.86	
50	57 60.3*)	57.5 60.8	165	18	125	4	M 16 (3/4")	18	2.51 2.47	
65	76.1*)	76.6	185	18	145	4	M 16 (3/4")	18	3.00	
80	88.9*)	89.4	200	20	160	4	M 16 (3/4")	18	3.79	
100	108 114.3*)	108.5 114.8	220	20	180	8	M 16 (3/4")	18	4.20 4.03	
125	133 139.7*)	133.5 140.2	250	22	210	8	M 16 (3/4")	18	5.71 5.46	
150	159 168.3*)	159.5 168.8	285	22	240	8	M 20 (1 1/4")	23	6.72 6.57	
175	191 193.7*)	192 194.7	315	24	270	8	M 20 (1 1/4")	23	8.60 8.45	
200	216 219.1*)	217 220.1	340	24	295	8	M 20 (1 1/4")	23	9.50 9.31	
250	267 273*)	268 274	395	26	350	12	M 20 (1 1/4")	23	12.5 11.9	
400	406.4*) 419	407.4 420	585	32	515	16	M 24 (1 3/8")	27	27.9 25.9	
500	508*) 521	509 522	670	38	620	20	M 24 (1 3/8")	27	37.9 41.1	

**DIN 2632**

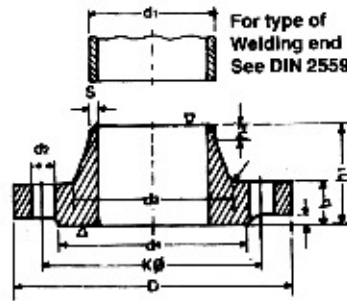
**Welding Neck Flanges for Nominal pressure 10**



Pipe		Flange				Neck				Raised Face		Bolts		Weight of one Flange 7.85 kg/dm <sup>3</sup> /kg	
NW	d <sub>1</sub>	D	b	k	h <sub>1</sub>	d <sub>3</sub>	s	f	h <sub>2</sub>	d <sub>4</sub>	f	Number	Thread		d <sub>2</sub>
200	216	340	24	295	62	232	5.9	10	18	288	3	8			
	235					11.3									
250	267	395	26	350	68	285	6.3	12	18	320	3				
	295					14.7									
300	318	445	26	400	68	335	7.1	12	18	370	4	12	M 20 (1 1/4")	23	
	344					17.6									
350	355.6	505	26	460	68	385	7.1	12	18	430	4				
	368					21.4									
400	406.4	565	26	515	72	440	7.1	12	18	482	4	16			
	419					26.1									
500	508	670	28	620	75	542	7.1	12	18	585	4		M 24 (1 3/8")	27	
	521					34.7									
600	609.6	780	28	725	80	642	7.1	12	18	685	5	20	M 27 (1")	30	
	622					42.2									

Note: For nominal sizes 10 up to 175 see DIN 2633.



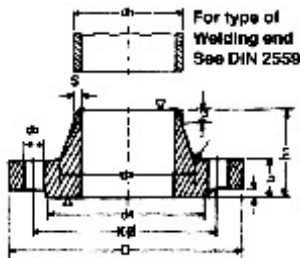


**DIN 2633**  
**Welding Neck Flanges for Nominal pressure 16**

Pipe		Flange				Neck				Raised Face		Bolts		Weight of one Flange 7.85 kg/dm <sup>3</sup> kg		
NW	d <sub>1</sub>	D	b	k	h <sub>1</sub>	d <sub>3</sub>	s	f	h <sub>2</sub>	d <sub>4</sub>	f	Number	Thread		d <sub>2</sub>	
10	14	90	14	60	35	25	1.8	4	6	40	2	4	M 12	(1/2")	14	0.580
	17.2					28										0.648
15	20	95	14	65	35	30	2	4	6	45	2	4	M 12	(1/2")	14	0.648
	21.3					32										0.952
20	25	106	16	75	38	38	2.3	4	6	58	2	4	M 12	(1/2")	14	0.952
	26.9					40										1.14
25	30	115	18	85	38	42	2.6	4	6	68	2	4	M 12	(1/2")	14	1.14
	33.7					45										1.69
32	38	140	16	100	40	52	2.6	6	6	78	2	4	M 12	(1/2")	14	1.69
	42.4					56										1.86
40	44.5	150	16	110	42	60	2.6	6	7	88	3	4	M 12	(1/2")	14	1.86
	48.3					64										2.53
50	57	165	18	125	45	72	2.9	6	8	102	3	4	M 12	(1/2")	14	2.53
	60.3					75										3.06
65	76.1	185	18	145	45	90	2.9	6	10	122	3	4	M 16	(3/8")	18	3.06
80	88.9	200	20	160	50	106	3.2	8	10	138	3	4	M 16	(3/8")	18	3.70
	108					125										4.62
100	114.3	220	20	180	52	131	3.6	8	12	158	3	8	M 16	(3/8")	18	4.62
	133					150										6.30
125	139.7	250	22	210	55	156	4	8	12	188	3	8	M 16	(3/8")	18	6.30
	159					175										7.75
150	168.3	285	22	240	55	184	4.5	10	12	212	3	8	M 20	(7/16")	23	7.75
	191					208										10.0
175	193.7	315	24	270	60	210	5.4	10	12	242	3	8	M 20	(7/16")	23	10.0
	216					232										11.0
200	219.1	340	24	295	62	235	5.9	10	16	268	3	12	M 20	(7/16")	23	11.0
	267					285										15.6
250	273	405	26	355	70	292	6.3	12	16	320	3	12	M 24	(7/8")	27	15.6
	318					338										22.0
300	323.9	460	28	410	78	344	7.1	12	16	378	4	16	M 24	(7/8")	27	22.0
	355.6					390										28.7
350	368	520	30	470	82	390	8	12	16	438	4	16	M 27	(1")	30	28.7
	406.4					445										36.3
400	419	580	32	525	85	445	8	12	16	490	4	20	M 30	(1 1/2")	33	36.3
	508					548										59.3
500	521	715	34	650	90	548	8	12	16	610	4	20	M 30	(1 1/2")	33	59.3
	609					652										73.4
600	622	840	36	770	95	652	8.8	12	18	725	5	24	M 33	(1 1/4")	36	73.4
	711.2					755										75.0
700	720	910	36	840	100	755	8.8	12	18	795	5	24	M 36	(1 3/8")	39	75.0
	812.8					855										99.0
800	820	1025	38	950	105	855	10	12	20	900	5	28	M 36	(1 3/8")	39	99.0
	914.4					955										119
900	920	1125	40	1050	110	955	10	12	20	1000	5	28	M 39	(1 1/2")	42	119
	1016					1058										159
1000	1020	1255	42	1170	120	1058	10	16	22	1115	5		M 39	(1 1/2")	42	159

4 bolts for ND 10 (nominal press@re) (the order then reads:  
Welding neck flange 80/88.9 ND 10 DIN 2633)

**DIN 2634**  
**Welding Neck Flanges for Nominal pressure 25**



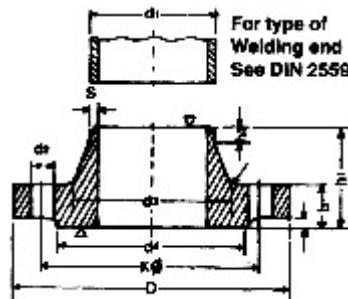
Pipe	Flange					Neck			Raised Face		Bolts		Weight of one Flange 7.85 kg/dm <sup>3</sup> /kg																								
	NW	d <sub>1</sub>	D	b	k	h <sub>1</sub>	d <sub>3</sub>	s	f	h <sub>2</sub>	d <sub>4</sub>	f		Number	Thread	d <sub>2</sub>																					
175	{191}	330	28	280	75	215	218	5.6	10	15	248	3	12	M 24	(1 1/8")	27	13.4																				
	193.7																17.0																				
200	216	360	30	310	80	240	244	6.3	10	16	278	3					16	M 27	(1 1/4")	30	24.4																
	219.1																				31.2																
250	267	425	32	370	88	292	298	7.1	12	18	335	3									20	M 30	(1 1/2")	33	45.0												
	273																								58.7												
300	318	485	34	430	92	345	352	8	12	18	395	4													20	M 33	(1 3/4")	36	86.1								
	323.9																												101								
350	355.6	555	38	490	100	398		8	12	20	450	4																	20	M 36	(1 3/4")	39	101				
	368																																				
400	406.4	620	40	550	110	452		8.8	12	20	505	4																					20	M 36	(1 3/4")	39	101
	419																																				
500	508	730	44	660	125	558		10	12	20	615	4	20	M 36	(1 3/4")	39																					101
	521																																				
600	609.6	845	46	770	125	660		11	12	20	720	5					20	M 36	(1 3/4")	39																	101
	622																																				

Note: For nominal sizes 10 up to 175 see DIN 2635.

**Loose Flange for Flange Collar PN 10**  
**(DIN 2642, DIN Connections)**



Nominal Pipe Size	Flange D mm	d5 mm	b mm	r mm	k mm	Drilling Number	d2 mm	Weight kg	Collar g mm
10	90	16	16	5	60	4	15	0.23	45
15	95	23	16	5	65	4	15	0.26	50
20	105	28	16	5	75	4	15	0.30	60
25	115	33	16	5	85	4	15	0.37	70
32	140	42	16	5	100	4	18	0.54	82
40	150	50	16	5	110	4	18	0.59	92
50	165	62	18	5	125	4	18	0.80	107
65	185	81	18	5	145	4	18	0.90	127
80	200	94	20	5	160	4	18	1.28	142
100	220	113	20	5	180	8	18	1.37	162
125	250	138	22	6	210	8	18	1.78	192
150	285	164	22	6	240	8	22	2.27	218
175	315	195	24	6	270	8	22	2.90	248
200	340	222	24	7	295	8	22	3.16	2.73
250	396	273	26	7	350	12	22	4.22	328
300	445	324	26	7	400	12	22	4.80	378
350	505	374	26	8	460	16	22	5.85	438
400	565	426	32	8	515	16	25	8.45	490
450	615	475	32	8	565	20	25	9.45	540
500	670	530	34	8	620	20	25	11.35	595
600	780	630	36	10	725	20	30	15.30	695
700	895	730	40	10	840	24	30	21.40	810
800	1015	832	44	10	950	24	34	30.50	916



**DIN 2635**  
**Welding Neck Flanges for Nominal pressure 40**

Pipe		Flange				Neck				Raised Face		Bolts		Weight of one Flange 7.85 kg/dm <sup>3</sup> kg					
NW	d <sub>1</sub>	D	b	k	h <sub>1</sub>	d <sub>3</sub>	s	f	h <sub>2</sub>	d <sub>4</sub>	f	Number	Thread		d <sub>2</sub>				
10	14	90	14	60	38	25	1.8	4	6	40	2	4	M 12	(1/2")	14	0.661			
	17.2					28										0.746			
15	20	95	16	65	38	30	2	4	6	45	2					106			
	21.3					32										1.29			
20	25	105	18	75	40	38	2.3	4	6	58	2					1.88			
	26.9					40										2.33			
25	30	115	18	85	40	42	2.6	4	6	68	2					2.82			
	33.7					46										3.74			
32	38	140	18	100	42	52	2.6	6	6	78	2		4.75						
	42.4					56							6.52						
40	44.5	150	18	110	45	60	2.6	6	7	88	3		9.07						
	48.3					64							11.8						
50	57	165	20	125	48	72	2.9	6	8	102	3		18.2						
	60.3					75							21.5						
65	76.1	185	22	145	52	90	2.9	6	10	122	3		12	M 27	(1")	30	34.9		
80	88.9	200	24	160	58	105	3.2	8	12	138	3		16	M 30	(1 1/8")	33	49.7		
100	108	235	24	190	65	128	3.6	8	12	162	3	16	M 33	(1 1/4")	36	68.1			
125	133	270	26	220	68	155	4	8	12	188	3	20	M 36	(1 3/8")	39	96.5			
	139.7					162										117			
150	159	300	28	250	75	182	4.5	10	12	218	3					M 39	(1 1/2")	42	117
	168.3					192													
175	191	350	32	295	82	215	5.6	10	15	260	3					M 42	(1 3/4")	45	132
	193.7					218													
200	216	375	34	295	88	240	6.3	10	16	285	3					M 45	(1 7/8")	48	147
	219.1					244													
250	267	450	38	320	105	298	7.1	12	18	345	3		M 48	(2")	51	162			
	273					306													
300	318	515	42	385	115	352	8	12	18	410	4		M 51	(2 1/8")	54	177			
	323.9					362													
350	355.6	580	46	450	125	408	8.8	12	20	460	4		M 54	(2 1/4")	57	192			
	368																		
400	406.4	660	50	585	135	462	11	12	20	535	4		M 57	(2 3/8")	60	207			
	419																		
500	508	755	52	670	140	562	14.2	12	20	615	4	M 60	(2 1/2")	63	222				
	521																		



## British Standard Pipe Flanges DIMENSION OF PIPE FLANGES AS PER TABLE BS-10

**Table D** for Working Steam Pressure upto 50 lbs per Sq. Inch.

**Table E** for Working Steam Pressure 50 lb and upto 100 lb per Sq. Inch.

Nominal Pipe Size	O. D. of Pipe	Dia. of Flange	Dia. of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness	Nominal Pipe Size	Dia. of Flange	Dia. of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	27/32"	3.3/4"	2.5/8"	4	1/2"	3/16"	1/2"	3.3/4"	2.5/8"	4	1/2"	1/4"
3/4"	1.1/16"	4"	2.7/8"	4	1/2"	3/16"	3/4"	4"	2.7/8"	4	1/2"	1/4"
1"	1.11/32"	4.1/2"	3.1/4"	4	1/2"	3/16"	1"	4.1/2"	3.1/4"	4	1/2"	9/32"
1.1/4"	1.11/16"	4.3/4"	3.7/16"	4	1/2"	1/4"	1. 1/4"	4.3/4"	3.7/16"	4	1/2"	5/16"
1.1/2"	1.29/32"	5.1/4"	3.7/8"	4	1/2"	1/4"	1. 1/2"	5.1/4"	3.7/8"	4	1/2"	11/32"
2"	2.3/8"	6"	4.1/2"	4	5/8"	5/16"	2"	6"	4.1/2"	4	5/8"	3/8"
2.1/2"	3"	6.1/2"	5"	4	5/8"	5/16"	2. 1/2"	6.1/2"	5"	4	5/8"	13/32"
3"	3.1/2"	7.1/4"	5.3/4"	4	5/8"	3/8"	3"	7.1/4"	5.3/4"	4	5/8"	7/16"
3.1/2"	4"	8"	6.1/2"	4	5/8"	3/8"	3.1/2"	8"	6.1/2"	8	5/8"	15/32"
4"	4.1/2"	8.1/2"	7"	4	5/8"	3/8"	4"	8.1/2"	7"	8	5/8"	1/2"
5"	5.1/2"	10"	8.1/4"	8	5/8"	1/2"	5"	10"	8.1/4"	8	5/8"	9/16"
6"	6.1/2"	11"	9.1/4"	8	5/8"	1/2"	6"	11"	9.1/4"	8	3/4"	11/16"
7"	7.1/2"	12"	10.1/4"	8	5/8"	1/2"	7"	12"	10.1/4"	8	3/4"	3/4"
8"	8.5/8"	13.1/4"	11.1/2"	8	5/8"	1/2"	8"	13. 1/4"	11.1/2"	8	3/4"	3/4"
9"	9.5/8"	14.1/2"	12.3/4"	8	5/8"	5/8"	9"	14.1/2"	12.3/4"	12	3/4"	13/16"
10"	10.3/4"	16"	14"	8	3/4"	5/8"	10"	16"	14"	12	3/4"	7/8"
12"	12.3/4"	18"	16"	12	3/4"	5/8"	12"	18"	16"	12	7/8"	1"
14"	14"	20.3/4"	18.1/2"	12	7/8"	3/4"	14"	20.3/4"	18.1/2"	12	7/8"	1"
16"	16"	22.3/4"	20.1/2"	12	7/8"	3/4"	16"	22.3/4"	20.1/2"	12	7/8"	1"
18"	18"	25.1/4"	23"	12	7/8"	7/8"	18"	25.1/4"	23"	16	7/8"	1.1/8"
20"	20"	27.3/4"	25.1/4"	16	7/8"	1"	20"	27.3/4"	25.1/4"	16	7/8"	1.1/4"
24"	24"	32.1/2"	29.3/4"	16	1"	1.1/8"	24"	32.1/2"	29.3/4"	16	1"	1.1/2"

**Table F** for Working Pressure above 100 lb and upto 150 lb per Sq. Inch.

**Table H** for Working Pressure above 150 lb and upto 250 lb per Sq. Inch.

Nominal Pipe Size	Dia. of Flange	Dia. of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness	Nominal Pipe Size	Dia. of Flange	Dia. of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	3.3/4"	2.5/8"	4	1/2"	3/8"	1/2"	4.1/2"	3.1/4"	4	5/8"	1/2"
3/4"	4"	2.7/8"	4	1/2"	3/8"	3/4"	4.1/2"	3.1/4"	4	5/8"	1/2"
1"	4.3/4"	3.7/16"	4	5/8"	3/8"	1"	4.3/4"	3.7/16"	4	5/8"	9/16"
1.1/4"	5.1/4"	3.7/8"	4	5/8"	1/2"	1. 1/4"	5.1/4"	3.7/8"	4	5/8"	11/16"
1.1/2"	5.1/2"	4.1/8"	4	5/8"	1/2"	1. 1/2"	5.1/2"	4.1/8"	4	5/8"	11/16"
2"	6.1/2"	5"	4	5/8"	5/8"	2"	6.1/2"	5"	4	5/8"	3/4"
2.1/2"	7.1/4"	5.3/4"	8	5/8"	5/8"	2.1/2"	7.1/4"	5.3/4"	8	5/8"	3/4"
3"	8"	6.1/2"	8	5/8"	5/8"	3"	8"	6.1/2"	8	5/8"	7/8"
3.1/2"	8.1/2"	7"	8	5/8"	3/4"	3.1/2"	8.1/2"	7"	8	5/8"	7/8"
4"	9"	7.1/2"	8	5/8"	3/4"	4"	9"	7.1/2"	8	5/8"	1"
5"	11"	9.1/4"	8	3/4"	7/8"	5"	11"	9.1/4"	8	3/4"	1.1/8"
6"	12"	10.1/4"	12	3/4"	7/8"	6"	12"	10.1/4"	12	3/4"	1.1/8"
7"	13.1/4"	11.1/2"	12	3/4"	7/8"	7"	13.1/4"	11.1/2"	12	3/4"	1.1/4"
8"	14.1/2"	12.3/4"	12	3/4"	1"	8"	14.1/2"	12.3/4"	12	3/4"	1.1/4"
9"	16"	14"	12	7/8"	1"	9"	16"	14"	12	7/8"	1.3/8"
10"	17"	15"	12	7/8"	1"	10"	17"	15"	12	7/8"	1.3/8"
12"	19.1/4"	17.1/4"	16	7/8"	1.1/8"	12"	19.1/4"	17.1/4"	16	7/8"	1.1/2"
14"	21.3/4"	19.1/2"	16	1"	1.1/4"	14"	21.3/4"	19.1/2"	16	1"	1.5/8"
16"	24"	21.3/4"	20	1"	1.1/4"	16"	24"	21.3/4"	20	1"	1.3/4"
18"	26.1/2"	24"	20	1.1/8"	1.3/8"	18"	26.1/2"	24"	20	1.1/8"	1.7/8"
20"	29"	26.1/2"	24	1.1/8"	1.1/2"	20"	29"	26.1/2"	24	1.1/8"	2"
24"	33.1/2"	30.3/4"	24	1.1/4"	1.5/8"	24"	33.1/2"	30.3/4"	24	1.1/4"	2.1/4"

## British Standard Pipe Flanges

**Table J** For working pressure above 250 lb and upto 350 lb per Sq. Inch. **Table K** For working pressure above 350 lb and upto 450 lb per Sq. Inch

Nominal Pipe Size	Dia. of Flange	Dia. of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	4.1/2"	3.1/4"	4	5/8"	5/8"
3/4"	4.1/2"	3.1/4"	4	5/8"	5/8"
1"	4.3/4"	3.7/16"	4	5/8"	3/4"
1.1/4"	5.1/4"	3.7/8"	4	5/8"	3/4"
1.1/2"	5.1/2"	4.1/8"	4	5/8"	7/8"
2"	6.1/2"	5"	4	3/4"	1"
2.1/2"	7.1/4"	5.3/4"	8	3/4"	1"
3"	8"	6.1/2"	8	3/4"	1.1/4"
3.1/2"	8.1/2"	7"	8	3/4"	1.1/4"
4"	9"	7.1/2"	8	3/4"	1.3/8"
5"	11"	9.1/4"	8	7/8"	1.1/2"
6"	12"	10.1/4"	12	7/8"	1.1/2"
7"	13.1/4"	11.1/2"	12	7/8"	1.5/8"
8"	14.1/2"	12.3/4"	12	7/8"	1.5/8"
9"	16"	14"	12	1"	1.3/4"
10"	17"	15"	12	1"	1.7/8"
12"	19.1/4"	17.1/4"	16	1"	2"
14"	21.3/4"	19.1/2"	16	1.1/8"	2.1/8"
16"	24"	21.3/4"	20	1.1/8"	2.1/4"
18"	26.1/2"	24"	20	1.1/4"	2.3/8"
20"	29"	26.1/2"	24	1.1/4"	2.1/2"
24"	33.1/2"	30.3/4"	24	1.3/8"	2.3/4"

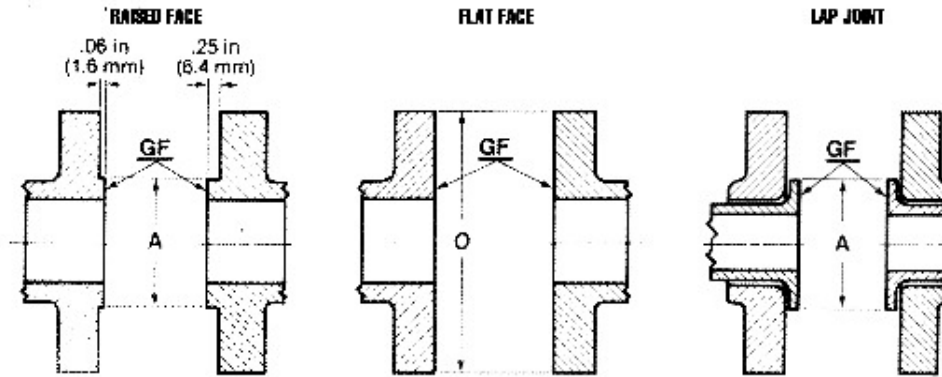
Nominal Pipe Size	Dia. of Flange	Dia. of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	4.1/2"	3.1/4"	4	5/8"	3/4"
3/4"	4.1/2"	3.1/4"	4	5/8"	3/4"
1"	5"	3.3/4"	4	5/8"	7/8"
1.1/4"	5.1/4"	3.7/8"	4	5/8"	7/8"
1.1/2"	6"	4.1/2"	4	3/4"	1"
2"	6.1/2"	5"	8	5/8"	1"
2.1/2"	7.1/4"	5.3/4"	8	3/4"	1.1/8"
3"	8"	6.1/2"	8	3/4"	1.1/4"
3.1/2"	9"	7.1/4"	8	7/8"	1.1/4"
4"	9.1/2"	7.3/4"	8	7/8"	1.3/8"
5"	11"	9.1/4"	12	7/8"	1.5/8"
6"	12"	10.1/4"	12	7/8"	1.5/8"
7"	13.1/2"	11.1/2"	12	1"	1.3/4"
8"	14.1/2"	12.1/2"	12	1"	1.7/8"
9"	16"	14"	16	1"	2"
10"	17"	15"	16	1"	2"
12"	19.1/4"	17"	16	1.1/8"	2.1/4"
14"	22.1/2"	20"	16	1.1/4"	2.3/8"
16"	24.3/4"	22.1/4"	20	1.1/4"	2.5/8"
18"	26.1/4"	25.3/4"	20	1.3/8"	3"
20"	31"	28	20	1.1/21"	3.1/4"

For 1/2" and 5/8" Bolts the diameters of the holes 1/16" In Larger than the bolts  
 For 3/4" bolts and sizes above, the diameter shall be 1/8" in Larger than the Bolts.

### BRITISH STANDARD PIPE FLANGES PRESSURE-TEMPERATURE RATINGS FOR CARBON STEEL FLANGES TEMPERATURE

Table	"F 0-450	500	550	600	650	700	750	800	825	850	875	900	Max. Hydr- raulic Test Pressure
	-17.8 °C to 232.2	260.0	267.8	315.6	343.3	371.1	399	427	441	454	468	482	
D	100	95	85	80	70	65	55	50					150
E	200	185	170	155	140	130	115	100					300
F	300	280	255	235	215	195	170	150					450
H	500	465	430	395	355	320	285	250	215	180	150	115	750
J	700	650	600	550	500	450	400	350	300	255	210	160	1050
K	900	835	770	705	645	580	515	450	390	325	265	205	1350
R	1200	1115	1030	945	855	770	685	600	520	435	355	275	1800
S	1800	1670	1545	1415	1285	1155	1030	900	780	655	535	415	2700
T	2800	2600	2400	2200	2000	1800	1600	1400	1210	1025	835	645	4200

# Flange Facing and Gasket Dimensions



RAISED FACE, FLAT FACE, LAP JOINT.

NPS	DN	* FLANGE FACING		GASKET DIMENSIONS								FULL FACE TYPE	FLAT RING OR FULL FACE TYPES
		RAISED FACE, LAP JOINT O. DIA.	FLAT FACE O. DIA.	FLAT RING TYPE GASKET (EXTENDING TO INSIDES OF BOLTS) OUTSIDE DIAMETER									
		A	O	CL. 150	CL. 300	CL. 400	CL. 600	CL. 900	CL. 1500	CL. 2500	OUTSIDE DIAMETER		
1/2	15	1.38 35		1.88 48	2.12 54	2.12 54	2.12 54	2.50 64	2.50 64	2.75 70		0.84 21	
3/4	20	1.69 43		2.25 57	2.62 67	2.62 67	2.62 67	2.75 70	2.75 70	3.00 76		1.06 27	
1	25	2 51		2.52 67	2.88 73	2.88 73	2.88 73	3.12 79	3.12 79	3.38 86		1.31 33	
1 1/4	32	2.3 58		3.00 76	3.25 83	3.25 83	3.25 83	3.50 89	3.50 89	4.12 105		1.89 42	
1 1/2	40	2.65 68		3.38 86	3.75 95	3.75 95	3.75 95	3.88 98	3.88 98	4.52 117		1.91 43	
2	50	3.62 92		4.12 105	4.38 111	4.38 111	4.38 111	5.62 143	5.62 143	5.75 146		2.38 60	
2 1/2	65	4.12 105		4.88 124	5.12 130	5.12 130	5.12 130	6.50 165	6.50 165	6.62 168		2.38 73	
3	80	5 127		5.38 137	5.68 149	5.68 149	5.68 149	6.62 168	6.62 175	7.75 197		3.5 89	
3 1/2	90	5.5 140		6.38 162	6.50 165	6.38 162	6.38 162	-	-	-		4 102	
4	100	6.19 157		6.88 175	7.12 181	7.00 178	7.62 194	8.12 206	8.25 210	9.25 235		4.5 114	
5	125	7.31 185		7.75 197	8.50 215	8.38 213	9.50 241	9.75 246	10.00 254	11.00 279		5.56 141	
6	150	8.5 216		8.75 222	9.88 251	9.75 248	10.50 267	11.38 289	11.12 283	12.50 318		6.32 163	
8	200	10.62 270		11.00 279	12.12 308	12.00 305	12.82 321	14.12 359	13.88 352	15.25 387		6.52 215	
10	250	12.75 324		13.38 340	14.25 362	14.12 359	15.75 400	17.12 435	17.12 435	18.75 476		7.75 275	
12	300	15 381		16.12 410	16.62 422	16.50 419	18.00 457	19.62 498	20.50 520	21.62 550		12.75 324	
14	350	16.25 413		17.75 451	18.12 466	19.00 483	19.88 492	20.50 520	22.75 580	-		14 356	
16	400	18.5 470		20.25 515	21.25 540	21.12 537	22.25 565	22.62 575	25.25 640	-		16 407	
18	450	21 533		21.82 550	23.50 595	23.38 595	24.12 615	25.12 640	27.75 705	-		18 457	
20	500	23 584		23.88 605	25.75 655	25.50 648	26.88 685	27.50 700	29.75 755	-		20 508	
24	600	27.25 692		28.25 718	30.5 775	30.25 770	31.12 790	33.00 839	35.50 902	-		24 610	

Same as flange outside diameter, see page 3 - 15 (Section III)

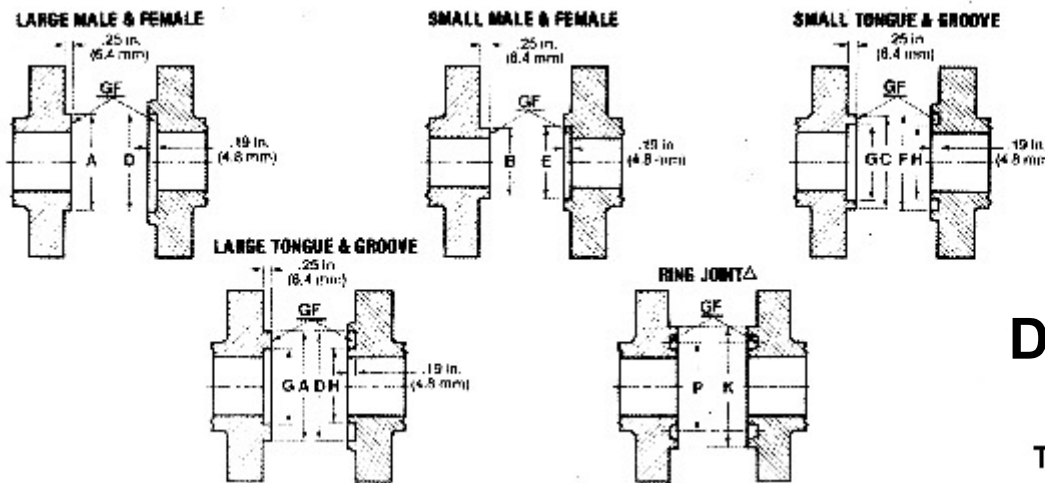
Gasket Facing is indicated on the facing drawings by "GF".

Dimensions conform to ANSI B16.5 and ANSI B16.21, where applicable.

\*A tolerance of  $\pm 0.016$  (0.4 mm) is allowed on the inside and outside diameters of all facings.

INCHES
MILLIMETERS





# Flange Facing and Gasket Dimensions

MALE & FEMALE, TONGUE & GROOVE

NPS	* FLANGE FACINGS DIMENSIONS								GASKET DIMENSIONS					
	DN	OUTSIDE DIAMETER						INSIDE DIAMETER		OUTSIDE DIAMETER			INSIDE DIAMETER	
		LARGE MALE; LARGE TONGUE	SMALL MALE	SMALL TONGUE	LARGE FEMALE; LARGE GROOVE	SMALL FEMALE	SMALL GROOVE	LARGE TONGUE; SMALL TONGUE	LARGE GROOVE; SMALL GROOVE	LARGE MALE & FEMALE; LARGE TONGUE & GROOVE	SMALL MALE & FEMALE	SMALL TONGUE & GROOVE	LARGE MALE & FEMALE	LARGE OR SMALL TONGUE & GROOVE
1/2	1.38	0.72	1.38	1.44	0.78	1.44	1.00	0.94	1.38	0.72	1.38	0.84	1.00	
15	35	18.3	35.0	36.5	19.9	36.5	25.4	23.8	35	18.3	35.0	21	25	
3/4	1.59	.94	1.59	1.75	1.00	1.75	1.21	1.25	1.59	.94	1.59	1.06	1.31	
20	43	23.8	42.9	44.5	25.4	44.4	33.3	31.8	43	23.8	42.9	27	33	
1	2.00	1.19	1.88	2.06	1.25	1.94	1.5	1.44	2.00	1.19	1.88	1.31	1.50	
25	51	30.2	47.5	52.4	31.8	49.2	38.1	36.5	51	30.2	47.6	33	38	
1 1/2	2.50	1.5	2.25	2.56	1.56	2.31	1.88	1.81	2.50	1.50	2.25	1.66	1.88	
32	64	38.1	57.2	65.1	39.7	58.7	47.8	46.0	64	38.1	57.2	42	48	
1 1/2	2.88	1.75	2.50	2.94	1.81	2.56	2.12	2.06	2.88	1.75	2.50	1.91	2.12	
40	73	44.4	63.5	74.6	45.0	65.1	54.0	52.4	73	44.4	63.5	49	54	
2	3.62	2.25	3.25	3.69	2.31	3.31	2.68	2.61	3.62	2.25	3.25	2.38	2.68	
50	92	57.2	82.6	93.7	58.7	84.1	73.0	71.4	92	57.2	82.6	60	73	
2 1/2	4.12	2.69	3.75	4.19	2.75	3.81	3.38	3.31	4.12	2.69	3.75	2.88	3.38	
65	105	68.3	95.2	106.4	69.0	96.6	85.7	84.1	105	68.3	95.2	73	88	
3	5.00	3.31	4.52	5.06	3.38	4.68	4.25	4.18	5.00	3.31	4.62	3.5	4.25	
80	127	84.1	117.5	128.8	85.7	119.1	106.0	104.4	127	84.1	117.5	89	106	
3 1/2	5.50	3.81	5.12	5.56	3.88	5.19	4.75	4.68	5.50	3.81	5.12	4.75	4.75	
90	140	96.8	130.2	141.3	98.4	131.8	120.8	118.1	140	96.8	130.2	102	121	
4	6.19	4.31	5.89	6.25	4.38	5.75	5.19	5.12	6.19	4.31	5.89	4.5	5.18	
100	157	109.5	144.5	158.8	111.1	146.0	131.8	130.2	157	109.5	144.5	111	130	
b	7.31	5.38	6.81	7.36	5.44	6.88	6.31	6.25	7.31	5.38	6.81	5.56	6.31	
125	165	136.5	173.0	187.3	138.1	174.8	160.0	158.8	165	136.5	173.0	141	161	
6	8.50	6.38	8.00	8.55	6.44	8.06	7.5	7.44	8.50	6.38	8.00	6.62	7.50	
150	216	161.9	203.2	217.5	163.5	204.8	190.5	188.9	216	161.9	203.2	168	191	
8	10.62	8.38	10.00	10.67	8.44	10.56	9.38	9.31	10.62	8.38	10.00	8.62	9.38	
200	270	212.7	254.0	271.0	214.8	255.6	238.1	236.5	270	212.7	254.0	219	238	
10	12.75	10.5	12.00	12.81	10.58	12.38	11.25	11.19	12.75	10.50	12.00	10.75	11.25	
250	324	266.7	304.8	325.4	268.8	309.4	285.8	284.2	324	266.7	304.8	273	286	
12	15.0	12.5	14.25	15.06	12.56	14.31	13.5	13.44	15.00	12.50	14.25	12.75	13.50	
300	381	317.5	362.0	382.6	319.1	363.5	342.9	341.3	381	317.5	362.0	324	343	
14	16.25	13.75	15.50	16.31	13.81	15.56	14.75	14.69	16.25	13.75	15.50	14	14.75	
350	418	349.2	393.7	414.3	350.8	395.3	374.8	373.1	418	349.2	393.7	358	375	
16	18.5	15.75	17.62	18.55	15.81	17.69	16.75	16.69	18.50	15.75	17.62	16	16.75	
400	470	400.0	447.7	471.3	401.8	449.3	425.4	423.9	470	400.0	447.7	437	426	
18	21.0	17.75	20.12	21.06	17.81	20.19	19.25	19.19	21.00	17.75	20.12	18	19.25	
450	538	450.9	511.2	535.0	452.4	512.8	489.0	487.4	538	450.9	511.2	457	489	
20	23.0	19.75	22.0	23.06	19.81	22.35	21.0	20.94	23.00	19.75	22.0	20	21.00	
600	684	601.7	658.8	685.8	603.2	660.4	633.4	631.8	684	601.7	658.8	510	536	
24	27.25	23.75	26.25	27.31	23.81	26.31	25.25	25.19	27.25	23.75	26.25	24	25.25	
600	692	603.3	666.8	693.7	604.8	668.3	641.4	639.8	692	603.3	666.8	610	640	

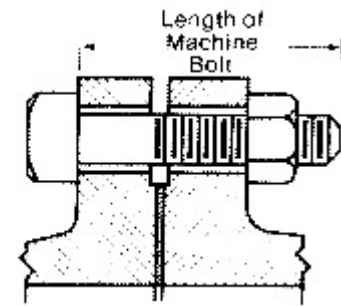
Gasket Facing Is Indicated on the facing drawings by "GF".

\*A tolerance of L.016" (0.4 mm) is allowed on the inside and outside diameters of all facings.

Dimensions conform to ANSI B16.5 and ANSI B16.21, where applicable.

INCHES
MILLIMETERS

# Bolt and Stud Dimensions\*



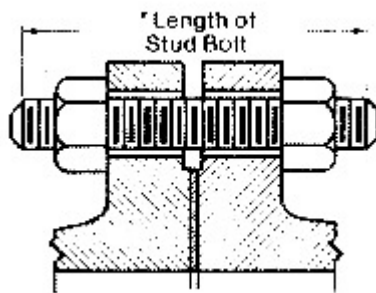
NPS DN	CLASS 150 (PN 20) FLANGES					CLASS 300 (PN 50) FLANGES					CLASS 300 (PN 64) FLANGES				
	NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH			NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH			NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH		
			STUD BOLTS		MACHINE BOLTS			STUD BOLTS		MACHINE BOLTS			STUD BOLTS		MACHINE BOLTS
			.06 1.6 RAISED FACE	RING JOINT	.06 1.6 RAISED FACE			.06 1.6 RAISED FACE	RING JOINT	.06 1.6 RAISED FACE			.25 6.4 RAISED FACE	MALE & FEMALE TONGUE AND GROOVE	RING JOINT
1/2	4	1/2	2.50	-	2.00	4	1/2	2.75	3.00	2.25	4	1/2	3.25	3.00	3.00
15	4	1/2	65	-	50	4	1/2	70	75	55	4	1/2	85	75	75
3/4	4	1/2	2.50	-	2.25	4	5/8	3.00	3.50	2.50	4	5/8	3.50	3.25	3.50
20	4	1/2	65	-	55	4	5/8	5	90	6.5	4	5/8	90	85	90
1	4	1/2	2.75	3.25	2.25	4	5/8	3.25	3.75	2.75	4	5/8	3.75	3.50	3.75
25	4	1/2	70	85	55	4	5/8	85	95	70	4	5/8	95	90	95
1 1/4	4	1/2	2.75	3.25	2.50	4	5/8	3.25	3.75	2.75	4	5/8	4.00	3.75	4.00
40	4	1/2	70	85	65	4	5/8	85	95	70	4	5/8	100	95	100
1 1/2	4	1/2	3.00	3.50	2.50	4	3/4	3.75	4.25	3.00	4	3/4	4.25	4.00	4.25
40	4	1/2	75	90	65	4	3/4	95	110	75	4	3/4	110	100	110
2	4	5/8	3.25	3.75	2.75	8	5/8	3.50	4.25	3.00	8	5/8	4.25	4.00	4.50
50	4	5/8	85	95	70	8	5/8	90	110	75	8	5/8	110	100	115
2 1/2	4	5/8	3.50	4.00	3.00	8	3/4	4.00	4.75	3.50	8	3/4	4.75	4.50	5.00
65	4	5/8	90	100	75	8	3/4	100	120	90	8	3/4	120	115	130
3	4	5/8	3.75	4.25	3.25	8	3/4	4.25	5.00	3.75	8	3/4	5.00	4.75	5.25
80	4	5/8	95	110	85	8	3/4	110	125	95	8	3/4	130	120	135
3 1/2	8	5/8	3.75	4.25	3.25	8	3/4	4.50	5.25	3.75	8	7/8	5.50	5.25	5.75
90	8	5/8	95	110	85	8	3/4	115	135	95	8	7/8	140	135	145
4	8	5/8	3.75	4.25	3.25	8	3/4	4.50	5.25	4.00	8	7/8	5.50	5.25	5.75
100	8	5/8	95	110	85	8	3/4	115	135	100	8	7/8	140	135	145
5	8	3/4	4.00	4.50	3.25	8	3/4	4.75	5.50	4.25	8	7/8	5.75	5.50	6.00
125	8	3/4	100	115	85	8	3/4	120	140	110	8	7/8	145	140	155
6	8	3/4	4.00	4.50	3.50	12	3/4	5.00	5.75	4.25	12	7/8	6.00	5.75	6.25
150	8	3/4	100	115	90	12	3/4	130	145	110	12	7/8	155	145	160
8	8	3/4	4.25	4.75	3.75	12	7/8	5.50	6.25	4.75	12	1	6.75	6.50	7.00
200	8	3/4	110	120	95	12	7/8	140	160	120	12	1	175	165	180
10	12	7/8	4.75	5.25	4.00	16	1	6.25	7.00	5.50	16	1 1/8	7.50	7.25	7.75
250	12	7/8	120	135	100	16	1	160	180	140	16	1 1/8	190	185	195
12	12	7/8	4.75	5.25	4.25	16	1 1/8	6.75	7.50	6.00	16	1 1/4	8.00	7.75	8.25
300	12	7/8	120	135	110	16	1 1/8	175	190	155	16	1 1/4	205	195	210
14	12	1	5.25	5.75	4.50	20	1 1/8	7.00	7.75	6.25	20	1 1/4	8.25	8.00	8.50
350	12	1	135	145	115	20	1 1/8	180	195	160	20	1 1/4	210	205	215
16	16	1	5.50	6.00	4.75	20	1 1/4	7.50	8.25	6.50	20	1 3/8	8.75	8.50	9.00
400	16	1	140	155	120	20	1 1/4	190	210	165	20	1 3/8	225	215	230
18	16	1 1/8	6.00	6.50	5.00	24	1 1/4	7.75	8.50	6.75	24	1 3/8	9.00	8.75	9.25
450	16	1 1/8	150	165	125	24	1 1/4	195	215	175	24	1 3/8	230	225	235
20	20	1 1/8	6.25	6.75	5.50	24	1 1/4	8.25	9.00	7.25	24	1 1/2	9.75	9.50	10.00
500	20	1 1/8	160	175	140	24	1 1/4	210	230	185	24	1 1/2	250	240	255
20	20	1 1/4	7.00	7.50	6.00	24	1 1/2	8.25	10.25	8.00	24	1 3/4	10.75	10.50	11.25
600	20	1 1/4	180	190	155	24	1 1/2	235	260	205	24	1 3/4	275	265	285

\*Length of Stud Bolt does not include the height of the points.

Bolt sizes are in inches.

Length of Male & Female and Tongue & Groove Stud Bolts are .25" (6.4 mm) less than those for the same size of .25" (6.4 mm) Raised Face Stud Bolts.

INCHES
MILLIMETRES



# Bolt and Stud Dimensions

NPS DN	CLASS 600 (PN 100) FLANGES				CLASS 900 (PN 160) FLANGES				CLASS 1500 (PN 250) FLANGES				CLASS 2500 (PN 400) FLANGES			
	NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH OF STUD BOLTS		NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH OF STUD BOLTS		NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH OF STUD BOLTS		NO. OF BOLTS	DIA. OF BOLTS (INCHES)	LENGTH OF STUD BOLTS	
			.25 6.4 RAISED FACE	RING JOINT			.25 6.4 RAISED FACE	RING JOINT			.25 6.4 RAISED FACE	RING JOINT			.25 6.4 RAISED FACE	RING JOINT
1/2	4	1/2	3.25	3.00	4	3/4	4.25	4.25	4	3/4	4.25	1.25	1	3/4	3.25	3.25
15	4	1/2	.85	.75	4	3/4	1.10	1.10	4	3/4	1.10	1.10	4	3/4	1.35	1.35
3/4	4	5/8	3.50	3.50	4	3/4	4.50	4.50	4	3/4	4.50	1.50	4	3/4	3.25	3.25
20	4	5/8	.90	.90	4	3/4	1.15	1.15	4	3/4	1.15	1.15	4	3/4	1.35	1.35
1	4	5/8	3.75	3.75	4	7/8	5.00	5.00	4	7/8	5.00	5.00	4	7/8	3.75	3.75
25	4	5/8	.95	.95	4	7/8	1.25	1.25	4	7/8	1.25	1.25	4	7/8	1.45	1.45
1 1/4	4	5/8	4.00	4.00	4	7/8	5.00	5.00	4	7/8	5.00	5.00	4	1	3.25	3.50
32	4	5/8	1.00	1.00	4	7/8	1.25	1.25	4	7/8	1.25	1.25	4	1	1.60	1.65
1 1/2	4	3/4	4.25	4.25	4	1	5.50	5.50	4	1	5.50	5.50	4	1 1/8	7.00	7.25
40	4	3/4	1.10	1.10	4	1	1.40	1.40	4	1	1.40	1.40	4	1 1/8	1.80	1.85
2	8	5/8	4.25	4.50	8	7/8	5.75	5.75	8	7/8	5.75	5.75	8	1	7.25	7.50
50	8	5/8	1.10	1.15	8	7/8	1.45	1.45	8	7/8	1.45	1.45	8	1	1.85	1.90
2 1/2	8	3/4	4.75	5.00	8	1	6.25	6.25	8	1	6.25	6.25	8	1 1/8	8.00	8.25
65	8	3/4	1.20	1.25	8	1	1.60	1.60	8	1	1.60	1.60	8	1 1/8	2.05	2.10
3	8	3/4	5.00	5.25	8	7/8	5.75	6.00	8	1 1/8	7.00	7.00	8	1 1/4	9.00	9.25
80	8	3/4	1.30	1.35	8	7/8	1.45	1.55	8	1 1/8	1.90	1.90	8	1 1/4	2.30	2.35
3 1/2	8	7/8	5.50	5.75	-	-	-	-	-	-	-	-	-	-	-	-
90	8	7/8	1.40	1.45	-	-	-	-	-	-	-	-	-	-	-	-
4	8	7/8	5.75	6.00	8	1 1/8	6.75	7.00	8	1 1/4	7.75	7.75	8	1 1/2	10.25	10.50
100	8	7/8	1.45	1.55	8	1 1/8	1.75	1.80	8	1 1/4	1.95	1.95	8	1 1/2	2.60	2.75
5	8	1	6.50	6.75	8	1 1/4	7.50	7.75	8	1 1/2	9.75	9.75	8	1 3/4	12.00	12.25
125	8	1	1.65	1.75	8	1 1/4	1.90	1.95	8	1 1/2	2.55	2.60	8	1 3/4	3.05	3.25
6	12	1	8.75	7.00	12	1 1/8	7.75	7.75	12	1 3/8	10.25	10.50	12	2	13.75	14.50
150	12	1	1.75	1.80	12	1 1/8	1.95	1.95	12	1 3/8	2.60	2.65	12	2	3.50	3.70
8	12	1 1/8	7.75	7.75	12	1 3/8	8.75	9.00	12	1 5/8	11.50	12.00	12	2	15.25	16.00
200	12	1 1/8	1.95	1.95	12	1 3/8	2.25	2.30	12	1 5/8	2.95	3.05	12	2	3.90	4.05
10	16	1 1/4	8.50	8.75	16	1 3/8	9.25	9.50	16	1 7/8	13.25	13.75	16	2 1/2	19.50	20.50
250	16	1 1/4	2.15	2.25	16	1 3/8	2.35	2.40	16	1 7/8	3.25	3.50	16	2 1/2	4.95	5.20
12	20	1 1/4	8.75	9.00	20	1 3/8	10.00	10.25	16	2	11.75	12.50	16	2 3/4	21.50	22.50
300	20	1 1/4	2.25	2.30	20	1 3/8	2.55	2.60	16	2	3.75	3.85	16	2 3/4	5.45	5.70
14	20	1 3/8	9.25	9.50	20	1 1/2	10.75	11.25	16	2 1/4	14.00	17.00				
350	20	1 3/8	2.35	2.40	20	1 1/2	2.75	2.85	16	2 1/4	4.05	4.30				
16	20	1 1/2	10.00	10.25	20	1 5/8	11.25	11.75	16	2 1/2	17.50	18.50				
400	20	1 1/2	2.55	2.60	20	1 5/8	2.85	3.00	16	2 1/2	4.45	4.70				
18	20	1 5/8	10.75	11.00	20	1 7/8	12.75	13.50	16	2 3/4	19.50	20.60				
450	20	1 5/8	2.75	2.80	20	1 7/8	3.25	3.45	16	2 3/4	4.85	5.20				
20	24	1 5/8	11.50	11.75	20	2	13.50	14.25	16	3	21.50	22.50				
500	24	1 5/8	2.95	3.00	20	2	3.45	3.60	16	3	5.45	5.70				
24	24	1 7/8	13.00	13.25	20	2 1/2	17.25	18.00	16	3 1/2	24.50	25.75				
600	24	1 7/8	3.30	3.35	20	2 1/2	4.40	4.65	16	3 1/2	6.20	6.65				

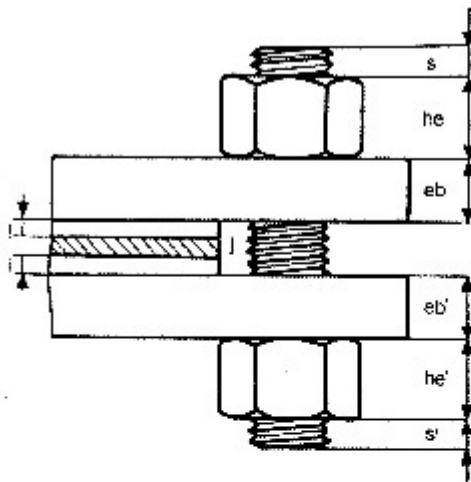
\*Length of Stud Bolt does not include the height of the points.

Bolt sizes are in inches.

Length of Male & Female and Tongue & Groove Stud Bolts are .25" (6.4 mm) less than those for the same size of .25" (6.4 mm) Raised Face Stud Bolts.

INCHES
MILLIMETERS





## METHOD FOR CALCULATING STUD BOLT LENGTHS

The stud-bolt theoretical length can be calculated by means of the formula:  
 $L = 2(S + he + eb + J) + J$

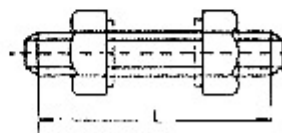
where

- free threads (equals 1/3 time bolt diameter)
- nut thickness (equals nominal bolt diameter)
- flange thickness
- height of raised face.

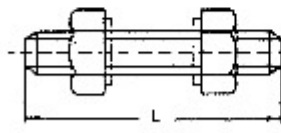
(for 150 and 300 rating height of raised face is included in eb height),  
 gasket thickness I.E. approximately 3 mm.

ATTENTION: difference of measuring lengths between ANSI B16.5 and BS 4882 - metric

Bolts : to ANSI B16.5  
BS 4882 inch sizes



Bolts : to BS 4882 metric



### SIZES OF STUD-BOLTS FOR ANSI B16.5 FLANGES TYPE RF

Nominal diameter of flange	150 Lbs			300 Lbs			600 Lbs			900 Lbs			1500 Lbs		
	N°	D of bolts	length	N°	D of bolts	length	N°	D of bolts	length	N°	D of bolts	length	N°	D of bolts	length
1/2	4	1/2 14	2" 1/2 80	4	1/2 14	2" 3/4 70	4	1/2 14	3" 1/4 90	4	3/4 20	4" 1/4 110	4	3/4 20	4" 1/2 110
3/4	4	1/2 14	2" 1/2 70	4	3/8 12	3" 80	4	3/8 12	3" 1/2 100	4	3/4 20	4" 1/2 120	4	3/4 20	4" 1/2 120
1"	4	1/2 14	2" 3/4 70	4	3/8 12	3" 1/4 80	4	3/8 12	3" 3/4 100	4	7/8 22	5" 130	4	7/8 22	5" 130
1" 1/4	4	1/2 14	3" 3/4 80	4	3/8 12	3" 1/4 90	4	3/8 12	4" 100	4	7/8 22	5" 130	4	7/8 22	5" 130
1" 1/2	4	1/2 14	3" 80	4	3/8 20	3" 3/4 100	4	3/4 20	4" 1/4 120	4	1" 27	6" 1/2 150	4	1" 27	6" 1/2 150
2"	4	3/8 18	3" 1/4 90	4	3/8 18	3" 1/2 100	4	3/8 18	4" 1/4 120	4	7/8 22	5" 3/4 150	4	7/8 22	5" 3/4 150
2" 1/2	4	3/8 18	3" 1/2 100	4	3/4 20	4" 110	4	3/4 20	4" 3/4 130	4	1" 27	6" 1/4 170	4	1" 27	6" 1/4 170
3"	4	3/8 18	3" 3/4 100	4	3/4 20	4" 1/4 110	4	3/4 20	5" 140	4	7/8 22	5" 3/4 150	4	1" 1/8 30	7" 180
3" 1/2	4	3/8 18	3" 3/4 100	4	3/4 20	4" 1/2 120	4	7/8 22	5" 1/2 150	4	1" 27	6" 1/2 170	4	1" 1/8 30	7" 180
4"	8	3/4 20	4" 100	8	3/4 20	4" 1/2 120	8	7/8 22	5" 1/2 150	8	1" 1/8 30	6" 3/4 180	8	1" 1/8 30	7" 180
5"	8	3/4 20	4" 100	8	3/4 20	4" 3/4 130	8	1" 27	6" 1/2 160	8	1" 1/4 33	7" 1/2 190	8	1" 1/2 36	8" 3/4 220
6"	8	3/4 20	4" 100	8	3/4 20	4" 3/4 130	8	1" 27	6" 3/4 160	8	1" 1/8 30	7" 3/4 190	8	1" 1/8 30	8" 3/4 220
8"	8	3/4 20	4" 1/4 120	12	7/8 22	5" 1/2 150	12	1" 1/8 30	7" 3/4 200	12	1" 3/8 36	8" 3/4 230	12	1" 3/8 36	9" 1/2 240
10"	12	7/8 22	4" 3/4 120	16	1" 27	6" 1/4 160	16	1" 1/4 33	8" 1/2 230	16	1" 3/8 36	9" 1/4 240	16	1" 7/8 48	10" 1/4 260
12"	12	7/8 22	4" 3/4 120	18	1" 1/8 30	6" 3/4 190	20	1" 1/4 33	8" 3/4 240	20	1" 3/8 36	9" 1/2 240	18	2" 52	11" 1/4 280
14"	12	1" 27	5" 1/4 130	20	1" 1/8 30	7" 200	20	1" 3/8 36	9" 1/4 250	20	1" 1/2 39	10" 3/4 280	16	2" 1/4 56	12" 1/2 320
16"	16	1" 27	5" 1/2 150	20	1" 1/4 33	7" 1/2 200	20	1" 1/2 39	10" 270	20	1" 1/2 39	11" 1/4 320	16	2" 1/2 64	13" 1/2 340
18"	18	1" 1/8 30	6" 160	24	1" 1/4 33	7" 3/4 210	20	1" 5/8 42	10" 3/4 290	20	1" 7/8 48	12" 3/4 340	18	2" 3/4 68	14" 1/2 370
20"	20	1" 1/8 30	6" 1/4 170	24	1" 1/4 33	8" 1/4 220	24	1" 5/8 42	11" 1/2 300	20	2" 52	13" 1/2 370	16	3" 76	16" 1/2 420
22"	20	1" 1/4 33	7" 180	24	1" 1/2 39	9" 250	24	1" 3/4 45	12" 1/2 330	-	-	-	-	-	-
24"	20	1" 1/4 33	7" 180	24	1" 1/2 39	9" 1/4 260	24	1" 7/8 48	13" 340	20	2" 1/2 64	17" 1/4 460	16	3" 1/2 90	19" 1/2 500

NOTE: Lengths in inches according to ANSI B16.5, measured from thread to thread, excluding points.  
 Lengths in mm are measured as "total overall length".  
 In both cases, above metric sizes should be used when ordering.

**SIZES OF STUD-BOLTS FOR ANSI B16.5 FLANGES TYPE RTJ**

Nominal diameter of flange	150 Lbs			300 Lbs			600 Lbs			900 Lbs			1500 Lbs		
	N°	Ø of bolts	length	N°	Ø of bolts	length	N°	Ø of bolts	length	N°	Ø of bolts	length	N°	Ø of bolts	length
1/2	-	-	-	4	1/2"	3"	4	1/2"	3"	4	3/4"	4" 1/4	4	3/4"	4" 1/4
3/4	-	-	-	4	5/8"	3" 1/2	4	5/8"	3" 1/2	4	3/4"	4" 1/2	4	3/4"	4" 1/2
1"	4	1/2"	3" 1/4	4	5/8"	3" 3/4	4	5/8"	3" 3/4	4	7/8"	5"	4	7/8"	5"
1" 1/4	4	1/2"	3" 1/4	4	5/8"	3" 3/4	4	5/8"	4"	4	7/8"	5"	4	7/8"	5"
1" 1/2	4	1/2"	3" 1/2	4	3/4"	4" 1/4	4	3/4"	4" 1/4	4	1"	5" 1/2	4	1"	5" 1/2
2"	4	5/8"	3" 3/4	8	5/8"	4" 1/4	8	5/8"	4" 1/2	8	7/8"	5" 3/4	8	7/8"	5" 3/4
2" 1/2	4	5/8"	4"	8	3/4"	4" 3/4	8	3/4"	5"	8	1"	6" 1/4	8	1"	6" 1/4
3"	4	5/8"	4" 1/4	8	3/4"	5"	8	3/4"	5" 1/4	8	7/8"	6"	8	1" 1/8"	7"
3" 1/2	8	5/8"	4" 1/4	8	3/4"	5" 1/4	8	7/8"	5" 3/4	-	-	-	-	-	-
4"	8	5/8"	4" 1/4	8	3/4"	5" 1/4	8	7/8"	6"	8	1" 1/8"	7"	8	1" 1/4"	7" 3/4
5"	8	3/4"	4" 1/2	8	3/4"	5" 1/2	8	1"	6" 3/4	8	1" 1/4"	7" 3/4	8	1" 1/2"	9" 3/4
6"	8	3/4"	4" 1/2	12	3/4"	5" 3/4	12	1"	7"	12	1" 1/8"	7" 3/4	12	1" 3/8"	10" 1/2
8"	8	3/4"	4" 3/4	12	7/8"	6" 1/4	12	1" 1/8"	7" 3/4	12	1" 3/8"	9"	12	1" 5/8"	12"
10"	12	7/8"	5" 1/4	16	1"	7"	16	1" 1/4"	8" 3/4	16	1" 3/8"	9" 1/2	12	1" 7/8"	13" 3/4
12"	12	7/8"	5" 1/4	16	1" 1/8"	7" 1/2	20	1" 1/4"	9"	20	1" 3/8"	10" 1/4	16	2"	15" 1/2
14"	12	1"	5" 3/4	20	1" 1/8"	7" 3/4	20	1" 3/8"	9" 1/2	20	1" 1/2"	11" 1/4	16	2" 1/4"	17"
16"	16	1"	6"	20	1" 1/4"	8" 1/4	20	1" 1/2"	10" 1/4	20	1" 5/8"	11" 3/4	16	2" 1/2"	18" 1/2
18"	16	1" 1/8"	6" 1/2	24	1" 1/4"	8" 1/2	20	1" 5/8"	11"	20	1" 7/8"	13" 1/2	16	2" 3/4"	20" 1/2
20"	20	1" 1/8"	6" 3/4	24	1" 1/4"	9"	24	1" 5/8"	11" 3/4	20	2"	14" 1/4	16	3"	22" 1/2
22"	20	1" 1/4"	7" 1/2	24	1" 1/2"	10"	24	1" 3/4"	13"	-	-	-	-	-	-
24"	20	1" 1/4"	7" 1/2	24	1" 1/2"	10" 1/4	24	1" 7/8"	13" 1/4	20	2" 1/2"	7" 3/4	16	3" 1/2"	25" 3/4

NOTE: . Lengths in inches according to ANSI B16.5, measured from thread to thread, excluding points  
 . Lengths in mm are measured as "total overall lengths"  
 . In both cases, above mentioned sizes should be used when ordering  
 . For tolerances on total lengths see below

**TOLERANCES ON LENGTH OF STUDBOLTS**

Diameter		1/2"	5/8"	3/4"	7/8"	1" t/m 2"
Thread.		13-UNC	11-UNC	10-UNC	C9-UN	8-UNC/B-UN
Maximum tolerance		+ 3,9mm	+ 4,6mm	+ 5,1mm	+ 5,6mm	+ 6,4mm
Column A		Column B				
Length excl. points		Total minimum length (in mm)				
INCH	mm					
2"	50.8	54.7	55.4	55.9	56.5	57.2
2.1/4"	57.1	61.0	61.7	62.2	62.8	62.3
2.1/2"	63.5	67.4	68.1	68.6	69.2	69.9
2.3/4"	69.8	73.7	74.4	74.9	75.5	76.2
3"	76.2	80.1	80.8	81.3	81.9	82.6
3.1/4"	82.5	86.4	87.1	87.6	88.2	88.8
3.1/2"	88.9	92.8	93.5	94.0	94.6	95.3
3.3/4"	95.2	99.1	99.8	100.3	100.9	101.5
4"	101.6	105.5	106.2	106.7	107.3	108.0
4.1/4"	108.0	111.9	112.6	113.1	113.7	114.4
4.1/2"	114.3	118.2	118.9	119.4	120.0	120.7
4.3/4"	120.7	124.6	125.3	125.8	126.4	127.1
5"	127.0	130.9	131.6	132.1	132.7	133.4
5.1/4"	133.4	137.3	138.0	138.5	139.1	139.8
5.1/2"	139.7	143.6	144.3	144.8	145.4	146.1
5.3/4"	146.1	150.0	150.7	151.2	151.8	152.5
6"	152.4	156.3	157.0	157.5	158.1	158.8
6.1/4"	158.8	162.7	163.4	163.9	164.5	165.2
6.1/2"	165.1	169.0	169.7	170.2	170.8	171.5
6.3/4"	171.5	175.4	176.1	176.6	177.2	177.9
7"	177.8	181.7	182.4	182.9	183.6	184.2
7.1/4"	184.2	188.1	188.8	189.3	189.9	190.6
7.1/2"	190.5	194.4	195.1	195.6	196.2	196.9
7.3/4"	196.9	200.8	201.5	202.0	202.6	203.3
8"	203.2	207.1	207.8	208.3	208.9	209.6
8.1/4"	209.6	213.5	214.2	214.7	215.3	216.0
8.1/2"	215.9	219.8	220.5	221.0	221.6	222.3
8.3/4"	222.3	226.2	226.9	227.4	228.0	228.7
9"	228.6	232.5	233.2	233.7	234.3	235.0
9.1/4"	235.0	238.9	239.6	240.1	240.7	241.4
9.1/2"	241.3	245.2	245.9	246.4	247.0	247.7
9.3/4"	247.7	251.6	252.3	252.8	253.4	254.1
10"	254.0	257.9	258.6	259.1	259.7	260.4
10.1/4"	260.4	264.3	265.0	265.5	266.1	266.8
10.1/2"	266.7	270.6	271.3	271.8	272.4	273.1
10.3/4"	273.1	277.0	277.7	278.2	278.8	279.5
11"	279.4	283.3	284.0	284.5	285.1	285.8
11.1/4"	285.7	289.6	290.3	290.8	291.4	292.1
11.1/2"	292.1	296.0	296.7	297.2	297.8	298.5
11.3/4"	298.4	302.3	303.0	303.5	304.1	304.8
12"	304.8	308.7	309.4	309.9	310.5	311.2
12.1/4"	311.1	315.0	315.7	316.2	316.8	317.5
12.1/2"	317.5	321.4	322.1	322.6	323.2	323.9
12.3/4"	323.8	327.7	328.4	328.9	329.5	330.2
13"	330.2	334.1	334.8	335.3	335.9	336.6

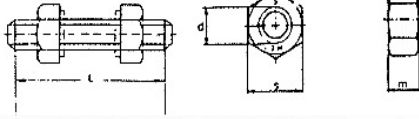
If stud-bolts are ordered in inch-sizes, length is ALWAYS measured from first thread to first thread, without points (see column A)  
 The length of the point is minimum one thread, however maximum two threads (see column B)  
 Everything fully in accordance with ASTM A 193 point 13.1

## STUDBOLTS WITH 2 HEXAGONAL NUTS

## UNC/8-UN

Bolts to ANSI B16.5  
and BS 4882

Nuts to ANSI B18.2  
and BS 4882



d:	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"
screw threads: UNC up to 1" incl. 8-UN over 1"	13	11	10	9	8	8	8	8
S max	22.22	26.97	31.75	36.52	41.27	46.02	50.8	55.57
min	21.59	26.19	30.79	35.41	40.01	44.61	49.23	53.83
m max	12.80	16.02	19.25	22.47	25.7	28.93	31.77	35
min	11.79	14.91	18.04	21.16	24.29	27.41	30.15	33.28
L*	WEIGHT IN KG PER 1,000 PIECES (INCLUDING 2 NUTS)							
2	99.2	169.7	266.5					
2 1/4	104.2	178.1	280.5					
2 1/2	109.4	187.2	296.5					
2 3/4	114.5	195.2	305.6					
3	119.5	203.3	316.1					
3 1/4	124.7	211.2	327.8					
3 1/2	129.7	219.3	339.6					
3 3/4	134.8	227.4	351.5	509				
4	139.9	235.4	363.7	525.2				
4 1/4		243.5	376.1	541.4				
4 1/2		251.5	387.8	557.6	786.5			
4 3/4		259.6	398.6	573.8	799.0			
5		276.6	410.3	589.2	809.8			
5 1/4		280.1	423.3	606.0	831.2			
5 1/2		283.6	434.4	622.2	852.3	1132.6		
5 3/4		291.6	445.7	638.5	874.4	1159.7		
6		299.7	457.3	654.5	895.0	1187.4		
6 1/4		307.9	469.2	670.5	916.1	1215.0		
6 1/2		315.8	480.9	686.9	937.2	1242.0		
6 3/4		323.8	492.6	703.2	958.5	1269.8		
7		331.9	504.4	719.5	979.6	1296.8	1666.1	
7 1/4			512.6	735.7	1000.4	1324.6	1700.8	
7 1/2			528	761.9	1022.0	1351.8	1734.8	
7 3/4			539.3	773.4	1043.0	1379.6	1468.9	
8			551.5	784.0	1065.0	1406.4	1803.5	2267.9
8 1/4			563.3	800.3	1085.4	1433.4	1838.2	2301.4
8 1/2					1106.9	1461.4	1870.7	2343.6
8 3/4					1134.6		1906.9	2385.7
9					1149.4		1940.9	2427.4

\*L (length of studbolt) is the length of first thread to first thread, (without points).  
Method of ordering for Studbolt B7 1" x 7": 03850 1" x 7" B7/2H.

d:	1 1/2"	1 5/8"	1 3/4"	1 7/8"	2"
screw threads: UNC up to 1" incl. 8-UN over 1"	8	8	8	8	8
S max	60.32	65.07	69.85	74.62	79.37
min	58.43	63.02	67.72	72.24	76.84
m max	38.22	41.45	44.67	47.9	51.13
min	36.4	39.53	42.65	45.78	48.9
L*	WEIGHT IN KG PER 1,000 PIECES (INCLUDING 2 NUTS)				
8 1/2	2804.5				
8 3/4	2853.9				
9	2903.4				
9 1/4	2952.8				
9 1/2	3002.2	3675.8			
9 3/4	3051.7	3791.8			
10	3101.1	3849.8	4589.9		
10 1/2	3200	3965.8	4724.5		
11	3298.8	4081.9	4859.1		
11 1/2	3397.7	4197.9	4993.6		
12	3496.6	4313.9	5128.2	6133.6	
13		4546	5397.3	6442.6	
14		4778	5666.4	6751.6	
15			5935.6	7060.5	8061.8
16			6204.7	7369.5	8413.3
17				7678.4	8764.8
18				7987.4	9116.4
19				8296.3	9467.9
20				8605.3	9819.4

\*L (length of studbolt) is the length of first thread to first thread (without points).  
Method of ordering for Studbolt B7 1" x 7": 03850 1" x 7" B7/2H.