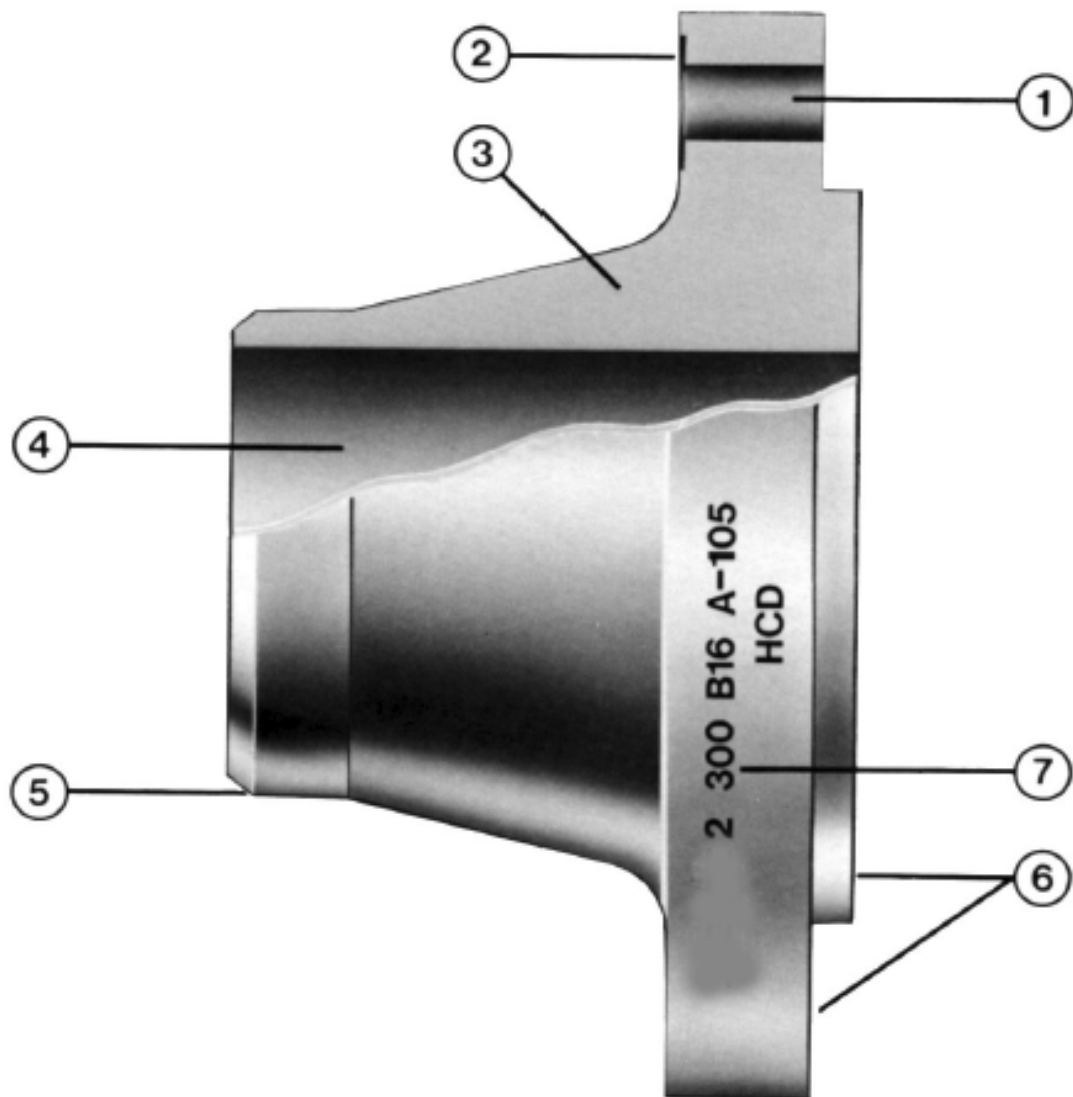




Steel Flanges





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.

FLANGE TYPES, FACINGS AND FINISHES

ANSI FLANGES

Most forged steel flanges correspond to the requirements of the American Standards Association (ASME/ANSI Standard B16.5) and the ASTM Specification A-105.

The following types are manufactured and stocked:

Welding Neck flanges, available in all pressure ratings and sizes, are butt-welded to the end of the pipe, and are usually specified when service conditions are severe and excellent workmanship necessary. Since the inside diameter of the flange must match that of the pipe, the flange bore should be specified in ordering.

Slip-on flanges, also available in most pressure ratings and sizes, are a popular type due to their ease of application. This flange slips over the end of the pipe and is usually set so that the flange face is about .375" (9.5mm) beyond the end of the pipe. This permits double-welding of the flange - one strength fillet weld to join the hub of the flange to the pipe, and a seal fillet weld inside the flange at the end of the pipe. Where operating conditions permit, the seal weld is omitted.

Slip-on flanges are most frequently used at lower pressure - Class 150 (PN 20) or Class 300 (PN 50) primary service pressure ratings. Many pipe designers are reluctant to use slip-ons for higher pressures, since (1) the joint between the flange and pipe is not as strong as in the welding neck type; and (2) the junction of the flange and pipe is more susceptible to corrosion.

Screwed or Threaded flanges are attached to the pipe like any other screwed fittings, and may be back-welded to seal the joint between pipe and flange. Although still available in most sizes and pressure ratings, screwed fittings today are used almost exclusively in smaller pipe sizes and at low pressures.

Lap Joint or Van Stone flanges are used on piping equipped with lap joint stub ends or with lapped pipe. They may be used at all pressures and are available in a full size range. These flanges slip over the pipe, and are not welded or otherwise fastened to it; bolting pressure is transmitted to the gasket by the pressure of the flange against the back of the pipe lap.

Lap Joint flanges have certain special advantages: (1) freedom to swivel around the pipe facilitates the lining up of opposing flange bolt holes; (2) lack of contact with the fluid in the pipe often permits the use of inexpensive carbon steel flanges with corrosion resistant pipe or tubing; (3) in systems which erode or corrode quickly, the flanges may be salvaged for re-use.

Socket-welding flanges contain a recess in the back of the flange to receive the end of the pipe, which is attached by a fillet weld around the hub of the flange. Since socket-welding connections are not as strong as butt-welded joints, the use of this type of flange is almost always confined to NPS 4 (DN 100) and smaller sizes, and to the lower pressure ratings. Its chief advantage lies in the ease of preparation and installation.

Blind flanges, available in all sizes and pressure ratings, are solid forgings used to close off the end of a piping system and to gain easy access to the interior of the line.

Reducing flanges are available. Refer to page 18.

FLANGE FACINGS

Unless otherwise specified, Class 150 (PN 20) and Class 300 (PN 50) flanges in all types except lap joint (or Van Stone) flanges are furnished with a .06" (1.6mm) raised face (which is included in the flange thickness dimension). Heavier pressure ratings are machined with a .25" (6.4 mm) raised face, in addition to the designated flange thickness.

When so ordered, these flange types can be furnished with a variety of other facings, such as male and female, ring joint, tongue and groove, etc.

Lap Joint flanges are machined with a flat face and a fillet radius to accommodate the stub end or pipe lap.

FLANGE FINISHES

The finish of contact faces of pipe flanges and connecting end flanges of fittings shall be judged by visual comparison with AARH Standards and not by instruments having stylus tracers and electronic amplification (see ANSI/ASME B46.1)

The finishes required are given below. Other finishes may be furnished upon application.

RAISED FACE AND LARGE MALE AND FEMALE: Either a serrated-concentric or serrated-spiral finish having from 45 to 55 grooves per inch (0.6 to 1mm pitch) shall be used. The cutting tool employed shall have an approximate 0.06" (1.6mm) or larger radius. The resultant surface shall have a 125 to 250 microinch roughness.

TONGUE AND GROOVE AND SMALL MALE AND FEMALE: The gasket contact shall not exceed 125 microinch roughness.

RING JOINT: The side wall surface of gasket groove shall not exceed 63 microinch roughness.

OTHER TYPES

In addition to the ANSI flanges, the following types are carried in stock:

Orifice flanges are used for measuring fluid flow in piping systems. Their design conforms to the recommendations of the American Gas Association's Committee on Gas Measurement. Commonly furnished as either welding neck or slip-on type, they may also be ordered as screwed flanges. Orifice unions are available in Class 300 (PN 50) and heavier pressure ratings.

Each Orifice flange is equipped with two radially-drilled, tapped holes for metering, and with jack-screws to facilitate separation of the joint for removal of the orifice metering plate. Orifice flanges, unless otherwise specified, are furnished in pairs as a flange union, complete with bolts, nuts and jack-screws - but without the orifice plate. Gaskets are supplied with raised face flange unions, but not for ring-joint faced flanges, which use an integral gasket and orifice plate.

Light Weight Slip-on flanges, drilled to Class 125 ANSI Standards but of lighter construction than the regular slip-on type, are available for low-pressure systems.

Large Diameter flanges, in sizes beyond the B16.5 range, are available for special installations. Dimensions given herein are those most commonly used; however, flanges and rolled rings for large diameter pipe or for vessels and tanks can readily be made to other specifications.

Long Welding Necks are used primarily for outlets for vessels and tanks. Drilled to ANSI Standards, they are forged with long, heavy-wall, straight hubs, and finished with square cut ends.

MATERIAL AND MANUFACTURING STANDARDS

The manufacturing 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. CCTF 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 markings 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

*CCTF flanges are available in a wide range of alloy and stainless steels, including grades F304, F304L, F316, F316L. Please refer to CCTF catalogue "Stainless Steel Flanges" for the popular Classes 150 and 300 (PN 20 and 50).

MSS, API, AWWA, ANSI AND CSA STANDARDS

ANSI, MSS and API standards govern flange dimensions and tolerances. ASME/ANSI B16.5, 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). CSA standard CAN3-Z245 12-M96 covers the manufacture, dimensions, tolerances and material requirements for pipe line flanges. ASME/ANSI B16.36 covers Orifice flanges. The following MSS, API and AWWA 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
API6A:	Wellhead equipment
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
ASME/ANSI B31.1:	Power Piping
ASME/ANSI B31.3:	Petroleum and refinery piping
ASME/ANSI B31.4:	Liquid petroleum transportation piping systems
ASME/ANSI B31.5:	Refrigeration piping
ASME/ANSI B31.8:	Gas transmission and distribution piping systems
ANSI/ASME B36.10M:	Standard for wrought steel pipe
ANSI/ASME B36.19M:	Standard for stainless steel pipe
ANSI/ASME B16.47:	Large diameter pipe line flanges NPS 22 (DN 550) and NPS 26 (DN 650) through NPS 36 (DN900)

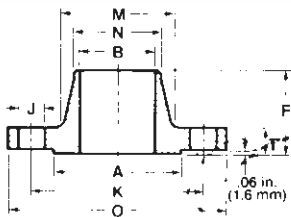
METRIC EQUIVALENTS

The International System (SI) metric equivalent of British units are shown throughout this catalogue.

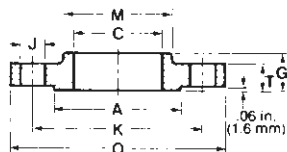
NPS (Nominal Pipe Size)	= DN* (Nominal Diameter)
Operating Pressure Class	= PN* (Pressure Number)
1 inch	= 25.4 millimetres
1 pound, weight	= 0.4536 kilograms
1 pound, pressure	= 0.06895 bars
1 p.s.i., stress	= 0.006895 megapascals (MPa)

*From the SI designations, Diamètre Nominal and Pression Nominale.

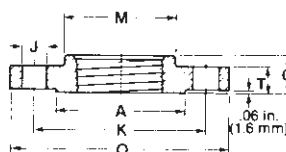
WELDING NECK



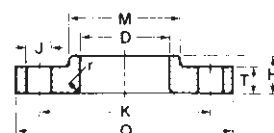
SLIP-ON



THREADED



LAP JOINT



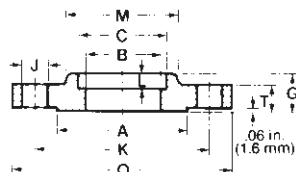
NPS	DN	FLANGE OUTSIDE DIAMETER O	FLANGE ² THICKNESS MIN. T	RAISED FACE DIA. A	BORE			LENGTH TRU HUB ²		
					WELDING NECK & SOCKET WELDING B ³	SLIP-ON & SOCKET WELD SOCKET MIN. C	LAP JOINT MIN. D	WELDING NECK F	SLIP-ON, THREADED & SOCK. WELD G	LAP JOINT H
1/2	15	3.50	.44	1.38	.62	.88	.90	1.88	.62	.62
3/4	20	3.88	.50	1.69	.82	1.09	1.11	2.06	.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	61.9	4.03	4.57	4.60	3.00	1.31	1.31
5	125	10.00	.94	7.31	5.05	5.66	5.69	3.50	1.44	1.44
6	150	11.00	1.00	8.50	6.07	6.72	6.75	3.50	1.56	1.56
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	19.00	1.25	15.00	12.00	12.88	12.92	4.50	2.19	2.19
14	350	21.00	1.38	16.25	To be specified by purchaser	14.14	14.18	5.00	2.25	3.12
16	400	23.50	1.44	18.50		359.2	360.2	127.0	57	79
18	450	25.00	1.56	21.00		16.16	16.19	5.00	2.50	3.44
20	500	27.50	1.69	23.00		410.4	411.2	127.0	64	87
24	600	32.00	1.88	27.25		18.18	18.20	5.50	2.69	3.81
						461.8	462.3	139.7	68	97
						20.20	20.25	5.69	2.88	4.06
						513.1	514.3	144.5	73	103
						24.25	24.25	6.00	3.25	4.38
						615.9	615.9	152.4	83	111

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

² Includes .06" (1.6 mm) raised face.

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

SOCKET WELDING



BLIND



CLASS 150 (PN20) FLANGES FORGED STEEL ASTM A-105 1ASME/ANSI B16.5

NPS DN	DRILLING			DEPTH ¹ OF SOCKET L	DIAMETER OF HUB		LAP JOINT FILLET RADIUS r	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 ¹	BLIND	LAP JOINT
1/2	4	.62	2.38	.38	1.19	.84	.12	2	1	1	1
15	4	16	60.3	10	30.2	21.4	3	0.9	.05	0.5	0.5
3/4	4	.62	2.75	.44	1.50	1.05	.12	2	2	2	2
20	4	16	69.8	11	38.1	26.6	3	0.9	0.9	0.9	0.9
1	4	.62	3.12	.50	1.94	1.32	.12	3	2	2	2
25	4	16	79.4	13	49.2	33.5	3	1.4	0.9	0.9	0.9
1 1/4	4	.62	3.50	.56	2.31	1.66	.19	3	3	3	3
32	4	16	88.9	14	58.7	42.1	5	1.4	1.4	1.4	1.4
1 1/2	4	.62	3.88	.62	2.56	1.90	.25	4	3	4	3
40	4	16	98.4	16	65.1	48.3	6	1.8	1.4	1.8	1.4
2	4	.75	4.75	.69	3.06	2.38	.31	6	5	5	5
50	4	20	120.6	17	77.6	60.4	8	2.7	2.3	2.3	2.3
2 1/2	4	.75	5.50	.75	3.56	2.88	.31	8	7	7	7
65	4	20	139.7	19	90.5	73.0	8	3.6	3.2	3.2	3.2
3	4	.75	6.00	.81	4.25	3.50	.38	10	8	9	8
80	4	20	152.4	21	107.9	88.9	10	4.5	3.6	4.1	3.6
3 1/2	8	.75	7.00	-	4.81	4.00	.38	12	11	13	11
90	8	20	177.8	-	122.2	101.6	10	5.4	5.0	5.9	5.0
4	8	.75	7.50	-	5.31	4.50	.44	15	13	17	13
100	8	20	190.5	-	134.9	114.3	11	6.8	5.9	7.7	5.9
5	8	.88	8.50	-	6.44	5.56	.44	19	15	20	15
125	8	23	215.9	-	163.5	141.3	11	8.6	6.8	9.1	6.8
6	8	.88	9.50	-	7.56	6.63	.50	24	19	26	19
150	8	23	241.3	-	192.1	168.3	13	10.9	8.6	11.8	8.6
8	8	.88	11.75	-	9.69	8.63	.50	39	30	45	30
200	8	23	298.4	-	246.1	219.1	13	17.7	13.6	20.4	13.6
10	12	1.00	14.25	-	12.00	10.75	.50	52	43	70	43
250	12	26	361.9	-	304.8	273.0	13	23.6	19.5	31.8	19.5
12	12	1.00	17.00	-	14.38	12.75	.50	80	64	110	64
300	12	26	431.8	-	365.1	323.8	13	36.3	29.0	49.9	29.0
14	12	1.12	18.75	-	15.75	14.00	.50	110	90	140	105
350	12	29	476.2	-	400.0	355.6	13	50.0	41.0	63.5	47.6
16	16	1.12	21.25	-	18.00	16.00	.50	140	98	180	140
400	16	29	539.7	-	457.2	406.4	13	64.0	44.5	81.6	63.5
18	16	1.25	22.75	-	19.88	18.00	.50	150	130	220	160
450	16	32	577.8	-	504.8	457.2	13	68.0	59.0	99.8	72.6
20	20	1.25	25.00	-	22.00	20.00	.50	180	165	285	195
500	20	32	635.0	-	558.8	508.0	13	81.6	75.0	129.0	88.5
24	20	1.38	29.50	-	26.12	24.00	.50	260	220	430	275
600	20	35	749.3	-	663.6	609.6	13	118	99.8	195.0	125.0

For bevel of Welding Neck, see page 48.

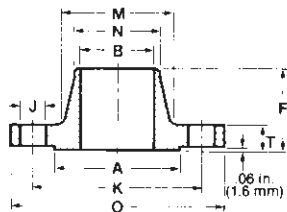
Gasket dimensions - page 20.

Bolting dimensions - page 22.

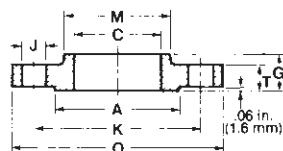
Flange facing dimensions - page 20.

POUNDS
KILOGRAMS

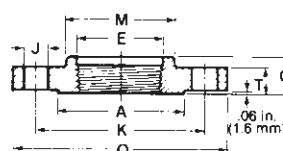
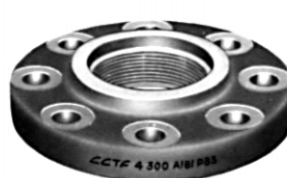
WELDING NECK



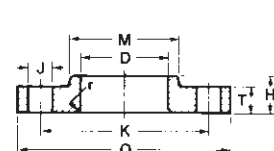
SLIP-ON



THREADED



LAP JOINT



NPS	DN	FLANGE OUTSIDE DIAMETER O	FLANGE ² THICKNESS MIN. T	RAISED FACE DIA. A	BORE				LENGTH THRU HUB ²		
					WELDING NECK & SOCKET WELDING B ³	SLIP-ON & SOCKET WELD SOCKET MIN. C	LAP JOINT MIN. D	THREADED COUNTER- BORE MIN. E	WELDING NECK F	SLIP-ON, THREADED & SOCK. WELD G	LAP JOINT H
1/2	15	3.75	.56	1.38	.62	.88	.90	.93	2.06	.88	.88
3/4	20	4.62	.62	1.69	.82	1.09	1.11	1.14	2.25	1.00	1.00
1	25	4.88	.69	2.00	1.05	1.36	1.38	1.41	2.44	1.06	1.06
1 1/4	32	5.25	.75	2.50	1.38	1.70	1.72	1.75	2.56	1.06	1.06
1 1/2	40	6.12	.81	2.88	1.61	1.95	1.97	1.99	2.69	1.19	1.19
2	50	6.50	.88	3.62	2.07	2.44	2.46	2.50	2.75	1.31	1.31
2 1/2	65	7.50	1.00	4.12	2.47	2.94	2.97	3.00	3.00	1.50	1.50
3	80	8.25	1.12	5.00	3.07	3.57	3.60	3.63	3.12	1.69	1.69
3 1/2	90	9.0	1.19	5.50	3.55	4.07	4.10	4.13	3.19	1.75	1.75
4	100	10.0	1.25	6.19	4.03	4.57	4.60	4.63	3.38	1.88	1.88
5	125	11.0	1.38	7.31	5.05	5.66	5.69	5.69	3.88	2.00	2.00
6	150	12.5	1.44	8.50	6.07	6.72	6.75	6.75	3.88	2.06	2.06
8	200	15.0	1.62	10.62	7.98	8.72	8.75	8.75	4.38	2.44	2.44
10	250	17.5	1.88	12.75	10.02	10.88	10.92	10.88	4.62	2.62	3.75
12	300	20.5	2.00	15.00	12.00	12.88	12.92	12.94	5.12	2.88	4.00
14	350	23.0	2.12	16.25	To be specified by purchaser	14.14	14.18	14.19	5.62	3.00	4.38
16	400	25.5	2.25	18.50		16.16	16.19	16.19	5.75	3.25	4.75
18	450	28.0	2.38	21.00		18.18	18.20	18.19	6.25	3.50	5.12
20	500	30.5	2.50	23.00		20.20	20.25	20.19	6.38	3.75	5.50
24	600	36.0	2.75	27.25		24.25	24.25	24.19	6.62	4.19	6.00
		915	70.0	692.2		615.9	615.9	614	168.3	106	152

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

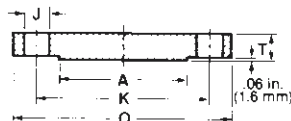
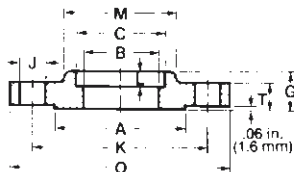
² Includes .06" (1.6 mm) raised face.

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

SOCKET WELDING



BLIND



CLASS 300 (PN50) FLANGES FORGED STEEL ASTM A-105 ¹ASME/ANSI B16.5

NPS	DN	DRILLING			DEPTH ¹ OF SOCKET	DIAMETER OF HUB		LAP JOINT FILLET RADIUS r	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 ¹	BLIND	LAP JOINT
1/2		4	.62	2.62	.38	1.50	.84	.12	2	2	2	2
	15	4	16	66.7	10	38.1	21.4	3	0.9	0.9	0.9	0.9
3/4		4	.75	3.25	.44	1.88	1.05	.12	3	3	3	3
	20	4	20	82.5	11	47.6	26.6	3	1.4	1.4	1.4	1.4
1		4	.75	3.50	.50	2.12	1.32	.12	4	3	3	3
	25	4	.20	88.9	13	53.8	33.5	3	1.8	1.4	1.4	1.4
1 1/4		4	.75	3.88	.56	2.50	1.66	.19	5	4	4	4
	32	4	20	98.4	14	63.5	42.1	5	2.3	1.8	1.8	1.8
1 1/2		4	.88	4.50	.62	2.75	1.90	.25	7	6	6	6
	40	4	23	114.3	16	69.9	48.3	6	3.2	2.7	2.7	2.7
2		8	.75	5.00	.69	3.31	2.38	.31	9	7	8	7
	50	8	20	127.0	17	84.1	60.3	8	4.1	3.2	3.6	3.2
2 1/2		8	.88	5.88	.75	3.94	2.88	.31	12	10	12	10
	65	8	23	149.2	19	100.0	73.0	8	5.4	4.5	5.4	4.5
3		8	.88	6.62	.81	4.62	3.50	.38	15	13	16	13
	80	8	23	168.3	21	117.5	88.9	10	6.8	5.9	7.3	5.9
3 1/2		8	.88	7.25	-	5.25	4.00	.38	18	17	21	17
	90	8	23	184.1	-	133.3	101.6	10	8.2	7.7	9.5	7.7
4		8	.88	7.88	-	5.75	4.50	.44	25	22	27	22
	100	8	23	200.0	-	146.0	114.3	11	11.3	10.0	12.2	10.0
5		8	.88	9.25	-	7.00	5.56	.44	32	28	35	28
	125	8	23	234.9	-	177.8	141.3	11	14.5	12.7	15.9	12.7
6		12	.88	10.62	-	8.12	6.63	.50	42	39	50	39
	150	12	23	269.9	-	206.4	168.3	13	19.0	17.7	22.7	17.7
8		12	1.00	13.0	-	10.25	8.63	.50	67	58	81	58
	200	12	26	330.2	-	260.3	219.1	13	30.4	26.3	36.7	26.3
10		16	1.12	15.25	-	12.62	10.75	.50	91	81	125	91
	250	16	29	387.3	-	320.7	273.0	13	41.3	36.7	56.7	41.3
12		16	1.25	17.75	-	14.75	12.75	.50	140	115	185	140
	300	16	32	450.8	-	374.6	323.8	13	63.5	52.2	83.9	63.5
14		20	1.25	20.25	-	16.75	14.00	.50	180	165	250	190
	350	20	32	514.3	-	425.5	355.6	13	81.6	74.8	113	86.2
16		20	1.38	22.50	-	19.00	16.00	.50	250	190	295	250
	400	20	35	571.5	-	482.6	406.4	13	113	86.2	134	113
18		24	1.38	24.75	-	21.00	18.00	.50	320	250	395	295
	450	24	35	628.6	-	533.4	457.2	13	145	113	179	134
20		24	1.38	27.00	-	23.12	20.00	.50	400	315	505	370
	500	24	35	685.80	-	587.4	508.0	13	181	143	229	168
24		24	1.62	32.00	-	27.62	24.00	.50	580	475	790	550
	600	24	42	812.80	-	701.7	609.6	13	263	215	358	249

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

For bevel of Welding Neck, see page 48.

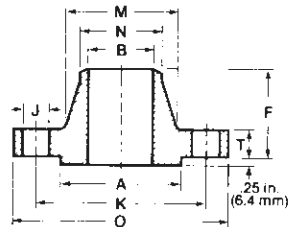
Gasket dimensions - page 20.

Bolting dimensions - page 22.

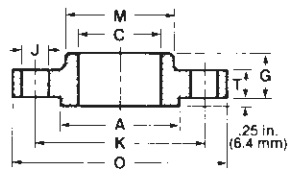
Flange facing dimensions - page 20.

POUNDS
KILOGRAMS

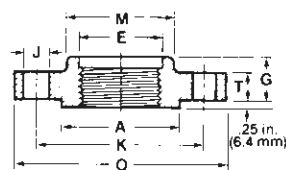
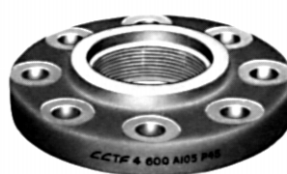
WELDING NECK



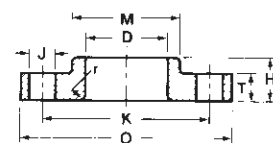
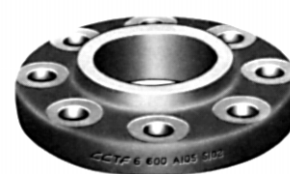
SLIP-ON



THREADED



LAP JOINT



NPS	DN	FLANGE OUTSIDE DIAMETER O	FLANGE ² THICKNESS MIN. T	RAISED FACE DIA. A	WELDING NECK & 'SOCKET WELDING B	BORE			LENGTH TRU HUB ²		
						SLIP-ON & 'SOCK. WELD. SOCKET MIN. C	LAP JOINT MIN. D	THREADED COUNTER- BORE MIN. E	WELDING NECK F	SLIP-ON, THREADED 'SOCKET WELDING G	LAP JOINT H
1/2		3.75	.56	1.38	To be specified by purchaser	.88	.90	.93	2.06	.88	.88
	15	95	14.5	34.9		22.2	22.9	23.5	52.4	22	22
3/4		4.62	.62	1.69		1.09	1.11	1.14	2.25	1.00	1.0
	20	117	16.0	42.9		27.8	28.2	29.0	57.1	25	25
1		4.88	.69	2.0		1.36	1.38	1.41	2.44	1.06	1.06
	25	124	17.5	50.8		34.5	34.9	36.0	61.9	27	27
1 1/4		5.25	.81	2.5		1.70	1.72	1.75	2.62	1.12	1.12
	32	133	21.0	63.5		43.3	43.7	44.5	66.7	29	29
1 1/2		6.12	.88	2.88		1.95	1.97	1.99	2.75	1.25	1.25
	40	156	22.5	73.0		49.6	50.0	50.5	69.8	32	32
2		6.5	1.0	3.62		2.44	2.46	2.50	2.88	1.44	1.44
	50	165	25.5	92.1		61.9	62.5	63.5	73.0	37	37
2 1/2		7.5	1.12	4.12		2.94	2.97	3.00	3.12	1.62	1.62
	65	191	29.0	104.8		74.6	75.4	76.0	79.4	41	41
3		8.25	1.25	5.0		3.57	3.60	3.63	3.25	1.81	1.81
	80	210	32.0	127.0		90.7	91.4	92.0	82.5	46	46
3 1/2		9.0	1.38	5.5		4.07	4.10	4.13	3.38	1.94	1.94
	90	229	35.0	139.7		103.4	104.1	105	85.7	49	49
4		10.75	1.5	6.19		4.57	4.60	4.63	4.0	2.12	2.12
	100	273	38.5	157.2		116.1	116.8	118	101.6	54	54
5		13.0	1.75	7.31		5.66	5.69	5.69	4.5	2.38	2.38
	125	330	44.5	185.7		143.7	144.5	145	114.3	60	60
6		14.0	1.88	8.5		6.72	6.75	6.75	4.62	2.62	2.62
	150	356	48.0	215.9		170.7	171.4	171	117.3	67	67
8		16.5	2.19	10.62		8.72	8.75	8.75	5.25	3.0	3.0
	200	419	55.5	269.9		221.5	222.2	222	133.3	76	76
10		20.0	2.5	12.75		10.88	10.92	10.88	6.0	3.38	4.38
	250	510	63.5	323.8		276.2	277.4	276	152.4	86	111
12		22.0	2.62	15.0		12.88	12.92	12.94	6.12	3.62	4.62
	300	560	66.5	381.0		327.0	328.2	329	155.6	92	117
14		23.75	2.75	16.25		14.14	14.18	14.19	6.5	3.69	5.0
	350	605	70.0	412.8		359.2	360.2	360	165.1	94	127
16		27.0	3.0	18.5		16.16	16.19	16.19	7.0	4.19	5.5
	400	685	76.5	469.9		410.4	411.2	411	177.5	106	140
18		29.25	3.25	21.0		18.18	18.20	18.19	7.25	4.62	6.0
	450	745	83.0	533.4		461.8	462.3	462	184.1	117	152
20		32.0	3.5	23.0		20.20	20.25	20.19	7.5	5.0	6.4
	500	815	89.0	584.2		513.1	514.3	513	190.5	127	165
24		37.0	4.0	27.25		24.25	24.25	24.19	8.0	5.5	7.25
	600	940	102.0	692.2		615.9	615.9	614	203.2	140	184

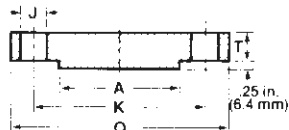
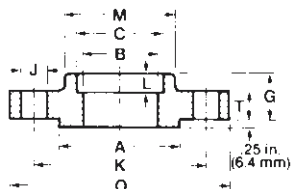
¹ Socket Welding Flanges, sizes NPS 3 1/2 (DN 90) and larger are not covered by ASME/ANSI B16.5.

² Does not include .25" (6.4 mm) raised face.

SOCKET WELDING



BLIND



CLASS 600 (PN 100) FLANGES

FORGED STEEL ASTM A-105 1ASME/ANSI B16.5

NPS DN	DRILLING			DEPTH OF SOCKET L	DIAMETER OF HUB		LAP JOINT FILLET RADIUS r	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 ¹	BLIND	LAP JOINT
1/2	4	.62	2.62	.38	1.5	.84	.12	2	2	2	2
15	4	16	66.7	10	38.1	21.4	3	0.9	0.9	0.9	0.9
3/4	4	.75	3.25	.44	1.88	1.05	.12	4	3	3	3
20	4	20	82.5	11	47.6	26.6	3	1.8	1.4	1.4	1.4
1	4	.75	3.5	.50	2.12	1.32	.12	4	4	4	4
25	4	.20	88.9	13	54.0	33.5	3	1.8	1.8	1.8	1.8
1 1/4	4	.75	3.88	.56	2.5	1.66	.19	6	5	5	5
32	4	20	98.4	14	63.9	42.1	5	2.7	2.3	2.3	2.3
1 1/2	4	.88	4.5	.62	2.75	1.90	.25	8	7	8	7
40	4	23	114.3	16	69.8	48.3	6	3.6	3.2	3.6	3.2
2	8	.75	5.0	.69	3.31	2.38	.31	12	9	10	9
50	8	20	127.0	17	84.1	60.3	8	5.4	4.1	4.5	4.1
2 1/2	8	.88	5.88	.75	3.94	2.88	.31	18	13	15	12
65	8	23	149.2	19	100.0	73.0	8	8.2	5.9	6.8	5.4
3	8	.88	6.62	.81	4.62	3.50	.38	23	16	20	15
80	8	23	168.3	21	117.5	88.9	10	10.4	7.3	9.1	6.8
3 1/2	8	1.0	7.25	-	5.25	4.00	.38	26	21	29	20
90	8	26	184.1	-	133.3	101.6	10	11.8	9.5	13.2	9.1
4	8	1.0	8.5	-	6.0	4.50	.44	42	37	41	36
100	8	26	215.9	-	152.4	114.3	11	19.0	16.8	18.6	16.3
5	8	1.12	10.5	-	7.44	5.56	.44	68	63	68	61
125	8	29	266.7	-	188.9	141.3	11	31.0	28.6	30.8	27.7
6	12	1.12	11.5	-	8.75	6.63	.50	81	80	86	78
150	12	29	292.1	-	222.2	168.3	13	36.7	36.3	39.0	35.4
8	12	1.25	13.75	-	10.75	8.63	.50	120	115	140	110
200	12	32	349.2	-	273.0	219.1	13	54.4	52.2	63.5	49.9
10	16	1.38	17.0	-	13.5	10.75	.50	190	170	230	170
250	16	35	431.8	-	342.9	273.0	13	86.2	77.1	104	77.2
12	20	1.38	19.25	-	15.75	12.75	.50	225	200	295	200
300	20	35	488.9	-	400.0	323.8	13	102	90.7	134	90.7
14	20	1.50	20.75	-	17.0	14.0	.50	280	230	355	250
350	20	39	527.0	-	431.8	355.6	13	127	104	161	113
16	20	1.62	23.75	-	19.5	16.0	.50	390	330	495	365
400	20	42	603.2	-	495.2	406.4	13	177	150	225	166
18	20	1.75	25.75	-	21.5	18.0	.50	475	400	630	435
450	20	45	654.0	-	546.1	457.2	13	215	181	286	197
20	24	1.75	28.5	-	24.0	20.0	.50	590	510	810	570
500	24	45	723.9	-	609.6	508.0	13	268	231	367	259
24	24	2.0	33.0	-	28.25	24.0	.50	830	730	1250	810
600	24	51	838.2	-	717.5	609.6	13	376	331	567	367

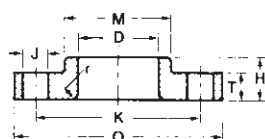
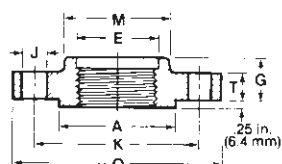
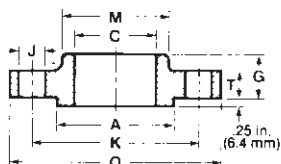
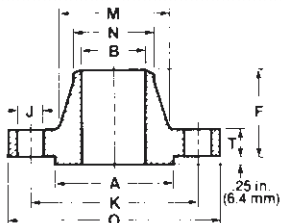
For bevel of Welding Neck, see page 48.

Gasket dimensions - page 20.

Bolting dimensions - page 22.

Flange facing dimensions - page 20.

POUNDS
KILOGRAMS



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

NPS	DN	FLANGE OUTSIDE DIAMETER O	FLANGE ² THICKNESS MIN. T	RAISED FACE DIA. A	BORE				LENGTH TRU HUB ²		
					WELDING NECK B	SLIP-ON, MIN. C	LAP JOINT MIN. D	THREADED COUNTER- BORE MIN. E	WELDING NECK F	SLIP-ON, THREADED G	LAP JOINT H
3	80	9.50	1.50	5.00	To be specified by purchaser	3.57	3.60	3.63	4.00	2.12	2.12
		241	38.5	127.0		90.7	91.4	92	101.6	54	54
4	100	11.50	1.75	6.19		4.57	4.60	4.63	4.50	2.75	2.75
		292	44.5	157.2		116.1	116.8	118	114.3	70	70
5	125	13.75	2.0	7.31		5.66	5.69	5.69	5.00	3.12	3.12
		349	51.0	185.7		143.7	144.5	145	127.0	79	79
6	150	15.00	2.19	8.50		6.72	6.75	6.75	5.50	3.38	3.38
		381	56.0	215.9		170.7	171.4	171	139.7	86	86
8	200	18.50	2.5	10.62		8.72	8.75	8.75	67.38	4.00	4.50
		470	63.5	269.9		221.5	222.2	222	161.9	102	114
10	250	21.50	2.75	12.75		10.88	10.92	10.88	7.25	4.25	5.00
		545	70.0	323.8		276.2	277.4	276	184.2	108	127
12	300	24.00	3.12	15.00		12.88	12.92	12.94	7.88	4.62	5.62
		610	79.5	381.0		327.0	328.2	329	200.0	117	143
14	350	25.25	3.38	16.25		14.14	14.18	14.19	8.38	5.12	6.12
		640	86.0	412.8		359.2	360.2	360	212.7	130	156
16	400	27.75	3.5	18.50		16.16	16.19	16.19	8.50	5.25	6.50
		705	89.0	469.9		410.4	411.2	411	215.9	133	165
18	450	31.00	4.0	21.00		18.18	18.20	18.19	9.00	6.00	7.50
		785	102.0	533.4		461.8	462.3	462	228.8	152	191
20	500	33.75	4.25	23.00		20.20	20.25	20.19	9.75	6.25	8.25
		855	108.0	584.2		513.1	514.3	513	247.6	159	210
24	600	41.00	5.5	27.25		24.25	24.25	24.19	11.50	8.00	10.50
		1040	140.0	692.2		615.9	615.9	614	292.1	203	267

¹ Including SOCKET WELDING FLANGES

² Does not include .25" (6.4 mm) raised face.

BLIND



CLASS 900 (PN 150) FLANGES FORGED STEEL ASTM A-105 ASME/ANSI B16.5

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

NPS	DN	DRILLING		DIAMETER OF HUB		LAP JOINT FILLET RADIUS	APPROXIMATE WEIGHT				
		NO. OF HOLES	DIAMETER OF HOLES	DIAMETER OF BOLT CIRCLE	AT BASE		AT CHAMFER	WELDING NECK	SLIP-ON, THREADED	BLIND	LAP JOINT
			J	K	M	N	r				
3		8	1.00	7.50	5.00	3.50	.38	.31	31	31	47
	80	8	26	190.5	127.0	88.9	10	14.1	14.1	14.1	21.3
4		8	1.25	9.25	6.25	4.50	.44	51	53	54	51
	100	8	32	234.9	158.7	114.3	11	23.1	24.0	24.5	23.1
5		8	1.38	11.00	7.50	5.56	.44	86	83	87	81
	125	8	35	279.4	190.5	141.3	11	39.0	37.6	39.5	36.7
6		12	1.25	12.50	9.25	6.63	.50	110	110	115	105
	150	12	32	317.5	234.9	168.3	13	49.9	49.9	52.2	47.6
8		12	1.50	15.50	11.75	8.63	.50	175	170	200	190
	200	12	39	393.7	298.4	219.1	13	79.4	77.1	90.7	86.2
10		16	1.50	18.50	14.50	10.75	.50	260	245	290	275
	250	16	39	469.9	368.3	273.0	13	118	111	132	125
12		20	1.50	21.00	16.50	12.75	.50	325	325	415	370
	300	20	39	533.4	419.1	323.8	13	147	147	188	168
14		20	1.62	22.00	17.75	14.00	.50	400	400	520	415
	350	20	42	558.8	450.8	355.6	13	181	181	236	188
16		20	1.75	24.25	20.00	16.00	.50	495	425	600	465
	400	20	45	615.9	508.0	406.4	13	225	193	272	211
18		20	2.00	27.00	22.25	18.00	.50	680	600	850	650
	450	20	51	685.8	565.1	457.2	13	308	272	386	295
20		20	2.12	29.50	24.50	20.00	.50	830	730	1075	810
	500	20	54	749.3	622.3	508.0	13	376	331	488	367
24		20	2.62	35.50	29.5	24.00	.50	1500	1400	2025	1550
	600	20	67	901.7	749.3	609.6	13	680	635	918	703

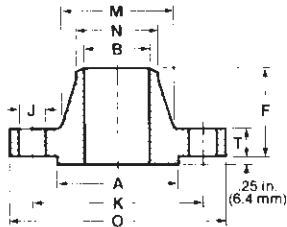
For bevel of Welding Neck, see page 48.

Gasket dimensions - page 20.

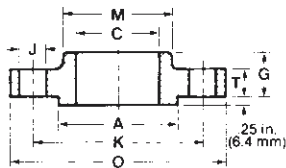
Bolting dimensions - page 22.

Flange facing dimensions - page 20.

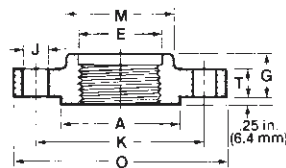
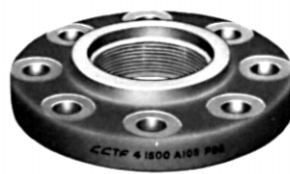
WELDING NECK



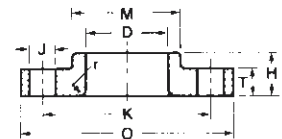
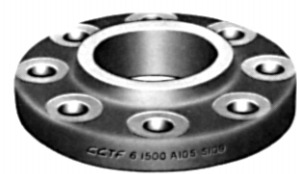
SLIP-ON



THREADED



LAP JOINT

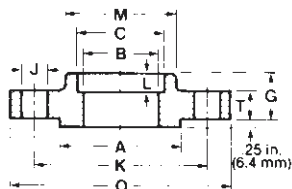


NPS	DN	FLANGE OUTSIDE DIAMETER O	FLANGE ² THICKNESS MIN. T	RAISED FACE DIA. A	WELDING NECK & 'SOCKET WELDING B	BORE			LENGTH TRU HUB ²		
						'SLIP-ON & 'SOCK. WELD. SOCKET MIN. C	LAP JOINT MIN. D	THREADED COUNTER- BORE MIN. E	WELDING NECK F	'SLIP-ON, THREADED, 'SOCKET WELDING G	LAP JOINT H
1/2	15	4.75	.88	1.38	To be specified by purchaser	0.88	.90	.93	2.38	1.25	1.25
		121	22.5	34.9		22.2	22.9	23.5	60.3	32	32
3/4	20	5.12	1.00	1.69		1.09	1.11	1.14	2.75	1.38	1.38
		130	25.5	42.9		27.8	28.2	29.0	69.8	35	35
1	25	5.88	1.12	2.00		1.36	1.38	1.41	2.88	1.62	1.62
		149	29.0	50.8		34.5	34.9	36.0	73.0	41	41
1 1/4	32	6.25	1.12	2.50		1.70	1.72	1.75	2.88	1.62	1.62
		159	29.0	63.5		43.3	43.7	44.5	73.0	41	41
1 1/2	40	7.00	1.25	2.88		1.95	1.97	1.99	3.25	1.75	1.75
		178	32.0	73.0		49.6	50.0	50.5	82.5	44	44
2	50	8.50	1.50	3.62		2.44	2.46	2.50	4.00	2.25	2.25
		216	38.5	92.1		61.9	62.5	63.5	101.6	57	57
2 1/2	65	9.62	1.62	4.12		2.94	2.97	3.00	4.12	2.50	2.50
		244	41.5	104.8		74.6	75.4	76.0	104.8	64	64
3	80	10.50	1.88	5.00		-	3.60	3.63	4.62	2.88	2.88
		267	48.0	127.0		-	91.4	92.0	117.5	73	73
4	100	12.25	2.12	6.19		-	4.60	4.63	4.88	3.56	3.56
		311	54.0	157.2		-	116.8	118	123.8	90	90
5	125	14.75	2.88	7.31		-	5.69	5.69	6.12	4.12	4.12
		375	73.5	185.7		-	144.5	145	155.6	105	105
6	150	15.50	3.25	8.50		-	6.75	6.75	6.75	4.69	4.69
		394	83.0	215.9		-	171.4	171	171.4	119	119
8	200	19.00	3.62	10.62		-	8.75	8.75	8.38	5.62	5.62
		483	92.0	269.9		-	222.2	222	212.7	143	143
10	250	23.00	4.25	12.75		-	10.92	10.88	10.00	6.25	7.00
		585	108.0	323.8		-	277.4	276	254.0	159	178
12	300	26.50	4.88	15.00		-	12.92	12.94	11.12	7.12	8.62
		675	124.0	381.0		-	328.2	329	282.6	181	219
14	350	29.50	5.25	16.25		-	14.18	-	11.75	-	9.50
		750	133.5	412.8		-	360.2	-	298.4	-	241
16	400	32.50	5.75	18.50		-	16.19	-	12.25	-	10.25
		825	146.5	469.9		-	411.2	-	311.1	-	260
18	450	36.00	6.38	21.00		-	18.20	-	12.88	-	10.88
		915	162.0	533.4		-	462.3	-	327.0	-	276
20	500	38.75	7.00	23.00		-	20.25	-	14.00	-	11.50
		985	178.0	584.2		-	514.3	-	355.6	-	292
24	600	46.00	8.00	27.25		-	24.25	-	16.00	-	13.00
		1170	203.5	692.2		-	615.9	-	406.4	-	330

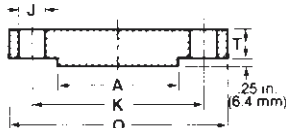
¹ Socket Welding and Slip-on Flanges, size NPS 3 1/2 (DN 80) and larger are not covered by ASME/ANSI B16.5.

² Does not include .25" (6.4 mm) raised face.

SOCKET WELDING



BLIND



CLASS 1500 (PN 250) FLANGES FORGED STEEL ASTM A-105 ASME/ANSI B16.5

NPS DN	DRILLING			'DEPTH OF SOCKET L	DIAMETER OF HUB		LAP JOINT FILLET RADIUS r	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	.88 23	3.25 82.5	.38 10	1.50 38.1	.84 21.4	.12 3	5 2.3	4 1.8	4 1.8	4 1.8
3/4 20	4	.88 23	3.50 88.9	.44 11	1.75 44.4	1.05 26.6	.12 3	6 2.7	5 2.3	6 2.7	5 2.3
1 25	4	1.00 26	4.00 101.6	.50 13	2.06 52.4	1.32 33.5	.12 3	9 4.1	8 3.6	8 3.6	8 3.6
1 1/4 32	4	1.00 26	4.38 111.1	.56 14	2.50 63.5	1.66 42.1	.19 5	10 4.5	9 4.1	9 4.1	9 4.1
1 1/2 40	4	1.12 29	4.88 123.8	.62 16	2.75 69.8	1.90 48.3	.25 6	13 5.9	12 5.4	13 5.9	12 5.4
2 50	8	1.00 26	6.50 165.1	.69 17	4.12 104.8	2.38 60.3	.31 8	25 11.3	25 11.3	25 11.3	25 11.3
2 1/2 65	8	1.12 29	7.50 190.5	.75 19	4.88 123.8	2.88 73.0	.31 8	36 16.3	36 16.3	35 15.9	35 16.0
3 80	8	1.25 32	8.00 203.2	-	5.25 133.3	3.50 88.9	.38 10	48 21.8	48 21.8	48 21.8	47 21.3
4 100	8	1.38 35	9.50 241.3	-	6.38 161.9	4.50 114.3	.44 11	73 33.1	73 33.1	73 33.1	75 34.0
5 125	8	1.62 42	11.50 292.1	-	7.75 196.8	5.56 141.3	.44 11	130 59.0	130 59.0	140 63.5	140 63.5
6 150	12	1.50 39	12.50 317.5	-	9.00 228.6	6.63 168.3	.50 13	165 75	165 75	160 72.6	170 77.1
8 200	12	1.75 45	15.50 393.7	-	11.50 292.1	8.63 219.1	.50 13	275 125	260 118	300 136	285 129
10 250	12	2.00 51	19.00 482.6	-	14.50 368.3	10.75 273.0	.50 13	455 206	435 197	510 231	485 220
12 300	16	2.12 54	22.50 571.5	-	17.75 450.6	12.75 323.8	.50 13	690 313	580 263	690 313	630 286
14 350	16	2.38 61	25.00 635.0	-	19.50 495.3	14.00 355.6	.50 13	940 426	-	975 442	890 404
16 400	16	2.62 67	27.75 704.8	-	21.75 552.4	16.00 406.4	.50 13	1250 567	-	1300 590	1150 522
18 450	16	2.88 74	30.50 774.7	-	23.50 569.9	18.00 457.2	.50 13	1625 737	-	1750 795	1475 669
20 500	16	3.12 80	32.75 831.8	-	25.25 641.3	20.00 508.0	.50 13	2050 930	-	2225 1010	1775 805
24 600	16	3.62 92	39.00 990.6	-	30.00 762.0	24.00 609.6	.50 13	3325 1510	-	3625 1644	2825 1326

For bevel of Welding Neck, see page 48.

Gasket dimensions - page 20.

Bolting dimensions - page 22.

Flange facing dimensions - page 20.

POUNDS
KILOGRAMS