



PETROL CHIMICA
SISTEMI PRODUTTIVI



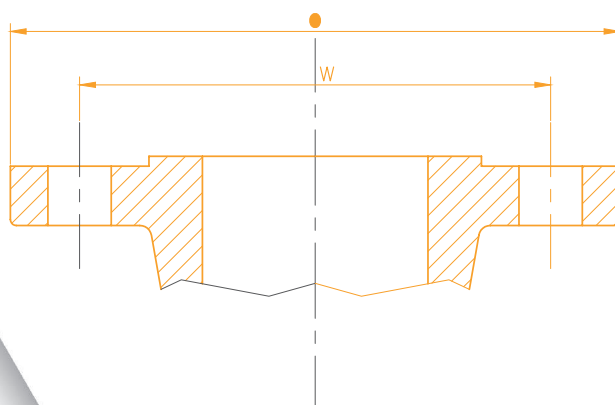
PIPES, FITTINGS & FLANGES.

Made in Italy

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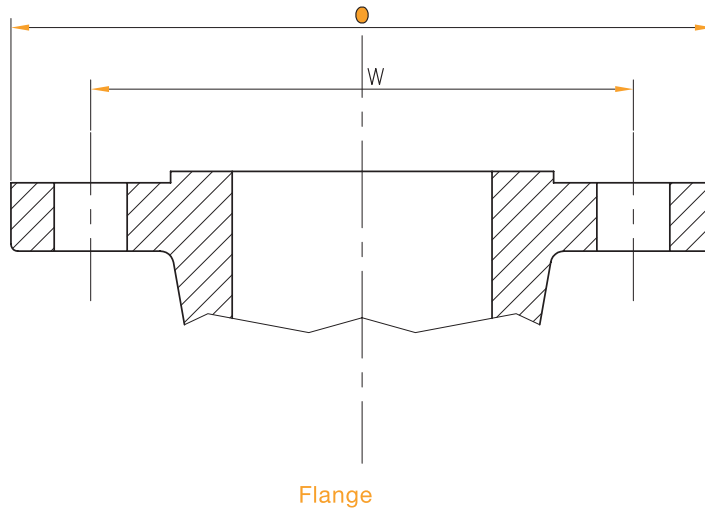


Templates for drilling class 1500 pipe flanges



Flange

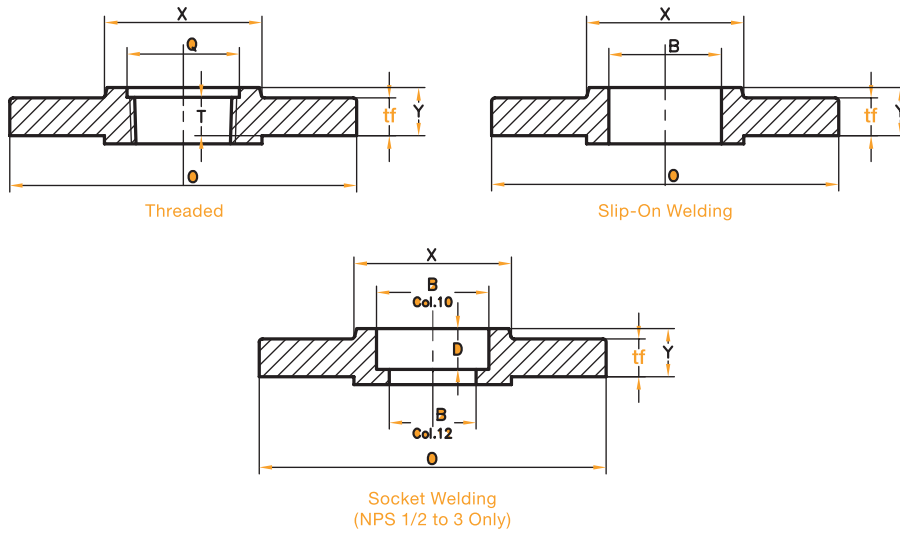
Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
1/2	120	82,6	7/8	4	3/4
3/4	130	88,9	7/8	4	3/4
1	150	101,6	1	4	7/8
1 1/4	160	111,1	1	4	7/8
1 1/2	180	123,8	1 1/8	4	1
2	215	165,1	1	8	7/8
2 1/2	245	190,5	1 1/8	8	1
3	265	203,2	1 1/4	8	1 1/8
4	310	241,3	1 3/8	8	1 1/4
5	375	292,1	1 5/8	8	1 1/2
6	395	317,5	1 1/2	12	1 3/8
8	485	393,7	1 3/4	12	1 5/8
10	585	482,6	2	12	1 7/8
12	675	571,5	2 1/8	16	2
14	750	635,0	2 3/8	16	2 1/4
16	825	704,8	2 5/8	16	2 1/2
18	915	774,7	2 7/8	16	2 3/4
20	985	831,8	3 1/8	16	3
24	1170	990,6	3 5/8	16	3 1/2



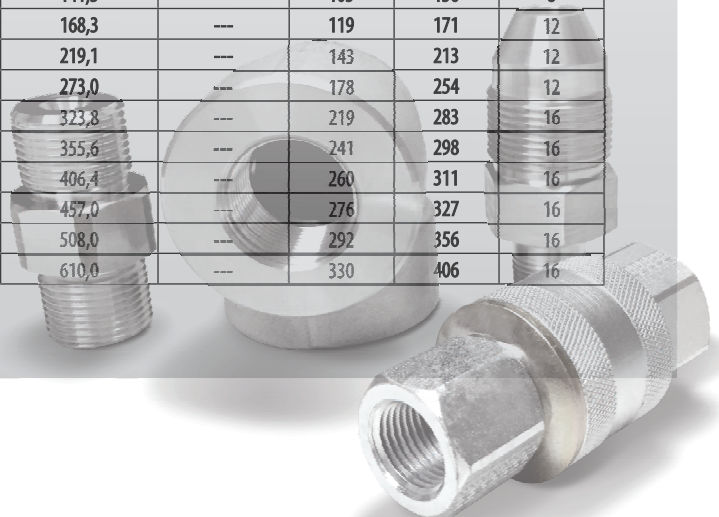
Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
1/2	120	82,6	7/8	4	3/4
3/4	130	88,9	7/8	4	3/4
1	150	101,6	1	4	7/8
1 1/4	160	111,1	1	4	7/8
1 1/2	180	123,8	1 1/8	4	1
2	215	165,1	1	8	7/8
2 1/2	245	190,5	1 1/8	8	1
3	265	203,2	1 1/4	8	1 1/8
4	310	241,3	1 3/8	8	1 1/4
5	375	292,1	1 5/8	8	1 1/2
6	395	317,5	1 1/2	12	1 3/8
8	485	393,7	1 3/4	12	1 5/8
10	585	482,6	2	12	1 7/8
12	675	571,5	2 1/8	16	2
14	750	635,0	2 3/8	16	2 1/4
16	825	704,8	2 5/8	16	2 1/2
18	915	774,7	2 7/8	16	2 3/4
20	985	831,8	3 1/8	16	3
24	1170	990,6	3 5/8	16	3 1/2

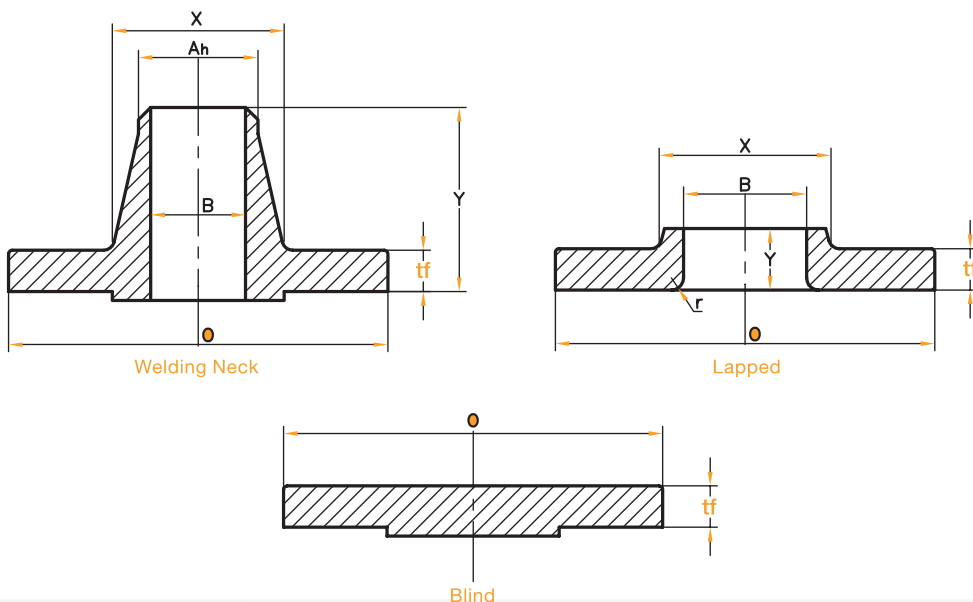


Templates for drilling class 1500 pipe flanges



Nominal pipe size (NPS)	Outside diameter of flange, O	Minimum thickness of flange, tf	Diameter of hub, X	Hub diameter beginning of chamfer welding neck, Ah	Threaded / slip-on / socket welding, Y	Length through hub		
						Lapped, Y	Welding neck, Y	Number of bolts.
1/2	120	22,3	38	21,3	32	32	60	4
3/4	130	25,4	44	26,7	35	35	70	4
1	150	28,6	52	33,4	41	41	73	4
1 1/4	160	28,6	64	42,2	41	41	73	4
1 1/2	180	31,8	70	48,3	44	44	83	4
2	215	38,1	105	60,3	57	57	102	8
2 1/2	245	41,3	124	73,9	64	64	105	8
3	265	47,7	133	101,6	---	73	117	8
4	310	54	162	114,3	---	90	124	8
5	375	73,1	197	141,3	---	105	156	8
6	395	82,6	229	168,3	---	119	171	12
8	485	92,1	292	219,1	---	143	213	12
10	585	108	368	273,0	---	178	254	12
12	675	123,9	451	323,8	---	219	283	16
14	750	133,4	495	355,6	---	241	298	16
16	825	146,1	552	406,4	---	260	311	16
18	915	162	597	457,0	---	276	327	16
20	985	177,8	641	508,0	---	292	356	16
24	1170	203,2	762	610,0	---	330	406	16

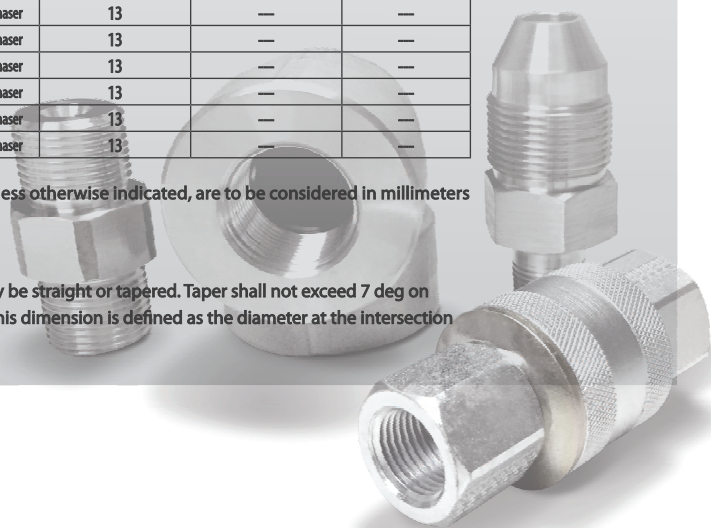


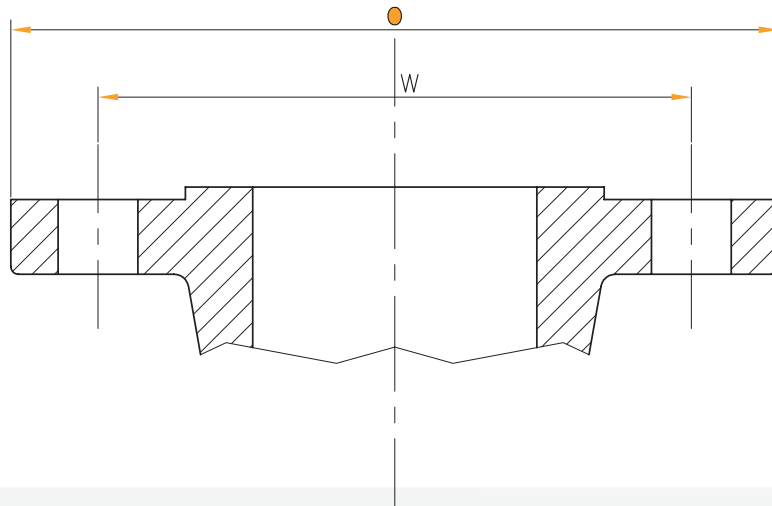


Minimum thread length threaded flange, T	Bore			Corner bore radius of lapped flange and pipe, r	Minimum counterbore threaded flange, Q	Depth of socket, D
	Minimum slip-on/socket welding, B	Minimum lapped, B	Welding neck/socket welding, B			
23	22,2	22,9	To be specified by the purchaser	3	23,6	10
26	27,7	28,2	To be specified by the purchaser	3	29	11
29	34,5	34,9	To be specified by the purchaser	3	35,8	13
31	43,2	43,7	To be specified by the purchaser	5	44,4	14
32	49,5	50,0	To be specified by the purchaser	6	50,6	16
39	61,9	62,5	To be specified by the purchaser	8	63,5	17
48	74,6	75,4	To be specified by the purchaser	8	76,2	19
---	---	104,1	To be specified by the purchaser	10	---	---
---	---	116,8	To be specified by the purchaser	11	---	---
---	---	144,4	To be specified by the purchaser	11	---	---
---	---	171,4	To be specified by the purchaser	13	---	---
---	---	222,2	To be specified by the purchaser	13	---	---
---	---	277,4	To be specified by the purchaser	13	---	---
---	---	328,2	To be specified by the purchaser	13	---	---
---	---	360,2	To be specified by the purchaser	13	---	---
---	---	411,2	To be specified by the purchaser	13	---	---
---	---	462,3	To be specified by the purchaser	13	---	---
---	---	514,4	To be specified by the purchaser	13	---	---
---	---	616	To be specified by the purchaser	13	---	---

The values, unless otherwise indicated, are to be considered in millimeters

Note 1: This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.

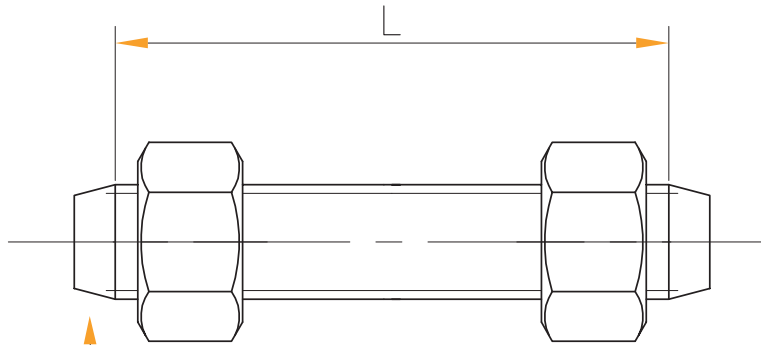




Flange

Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
1/2	135	88,9	7/8	4	3/4
3/4	140	95,2	7/8	4	3/4
1	160	108,0	1	4	7/8
1 1/4	185	130,2	1 1/8	4	1
1 1/2	205	146,0	1 1/4	4	1 1/8
2	235	171,4	1 1/8	8	1
2 1/2	265	196,8	1 1/4	8	1 1/8
3	305	228,6	1 3/8	8	1 1/4
4	355	273,0	1 5/8	8	1 1/2
5	420	323,8	1 7/8	8	1 3/4
6	485	368,3	2 1/8	8	2
8	550	438,2	2 1/8	12	2
10	675	549,8	2 5/8	12	2 1/2
12	760	619,1	2 7/8	12	2 3/4





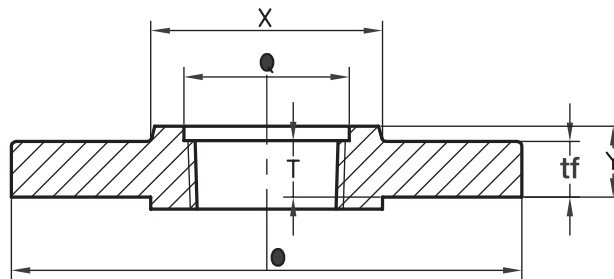
Point height [Note (1)]
Stud Bolt With Nuts

Length of bolts, L		
7-mm raised face	Male and female/tongue and groove	Ring joint
120	115	120
125	120	125
140	135	140
150	145	150
170	165	170
180	170	180
195	190	205
220	215	230
255	250	260
300	290	310
345	335	355
380	375	395
490	485	510
540	535	560

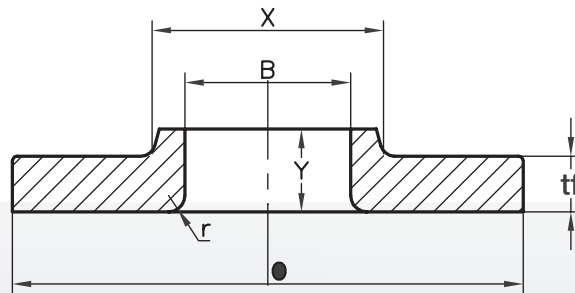
The values, unless otherwise indicated, are to be considered in millimeters

Note 1: The length of the stud bolt does not include the height of the points.



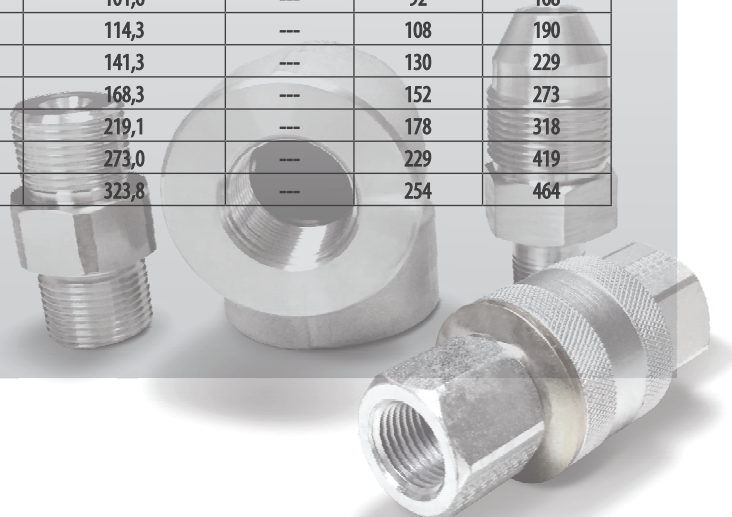


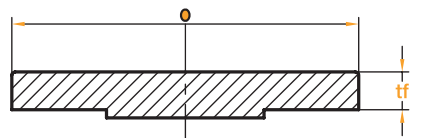
Threaded
(NPS 1/2 to 2 1/2 Only)



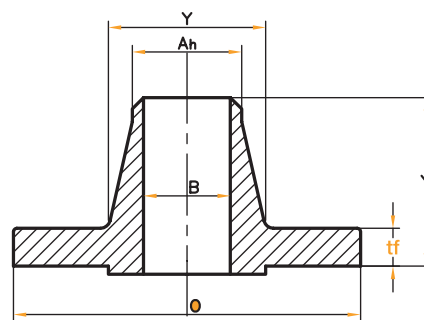
Lapped

Nominal pipe size (NPS)	Outside diam. of flange, O	Min. Thickness of flange, tf	Diam. of hub, X	Hub diam. Beginning of chamfer welding neck, Ah	Length through hub		
					Threaded, Y	Lapped, Y	Welding neck, Y
1/2	135	30,2	43	21,3	40	40	73
3/4	140	31,8	51	26,7	43	43	79
1	160	35,0	57	33,4	48	48	89
1 1/4	185	38,1	73	42,2	52	52	95
1 1/2	205	44,5	79	48,3	60	60	111
2	235	50,9	95	60,3	70	70	127
2 1/2	265	57,2	114	73,9	79	79	143
3	305	66,7	133	101,6	---	92	168
4	355	76,2	165	114,3	---	108	190
5	420	92,1	203	141,3	---	130	229
6	485	108,0	235	168,3	---	152	273
8	550	127,0	305	219,1	---	178	318
10	675	165,1	375	273,0	---	229	419
12	760	184,2	441	323,8	---	254	464





Blind

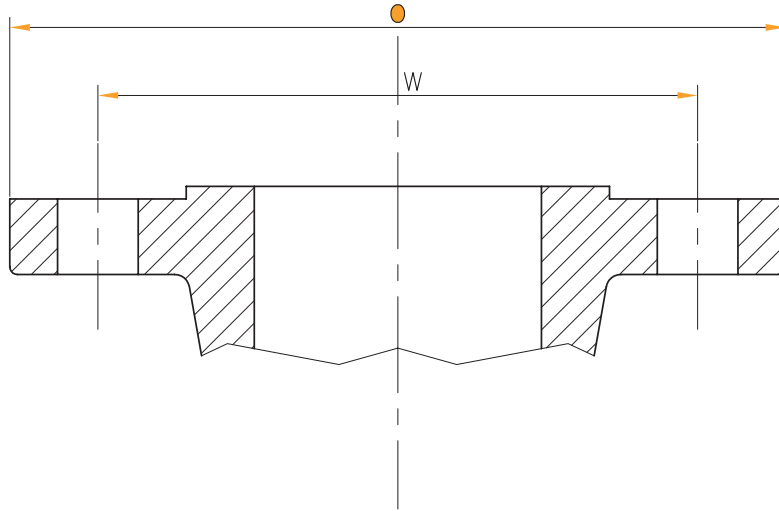


Welding Neck

Minimum thread length threaded flange, T	Bore			Minimum counterbore threaded flange, Q
	Min. lapped, B	Welding neck, B	Corner bore radius of lapped flange and pipe, r	
29	22,9	To be specified by the purchaser	3	23,6
32	28,2	To be specified by the purchaser	3	29
35	34,9	To be specified by the purchaser	3	35,8
39	43,7	To be specified by the purchaser	5	44,4
45	50,0	To be specified by the purchaser	6	50,6
51	62,5	To be specified by the purchaser	8	63,5
58	75,4	To be specified by the purchaser	8	76,2
---	104,1	To be specified by the purchaser	10	---
---	116,8	To be specified by the purchaser	11	---
---	144,4	To be specified by the purchaser	11	---
---	171,4	To be specified by the purchaser	13	---
---	222,2	To be specified by the purchaser	13	---
---	277,4	To be specified by the purchaser	13	---
---	328,2	To be specified by the purchaser	13	---

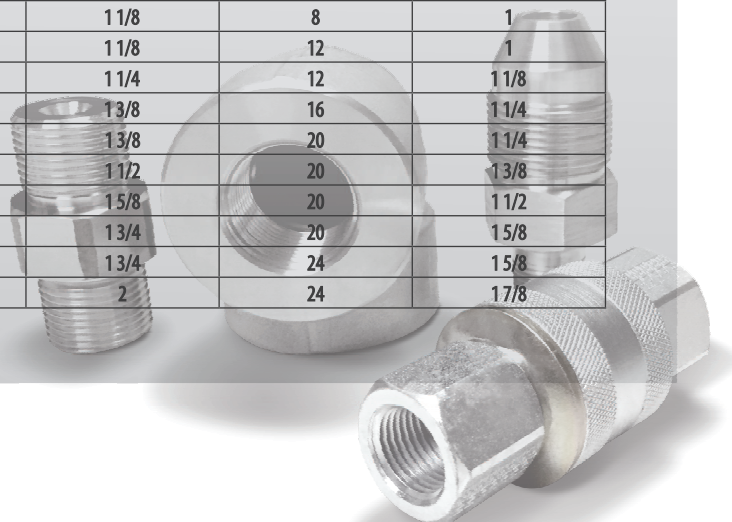
The values, unless otherwise indicated, are to be considered in millimeters

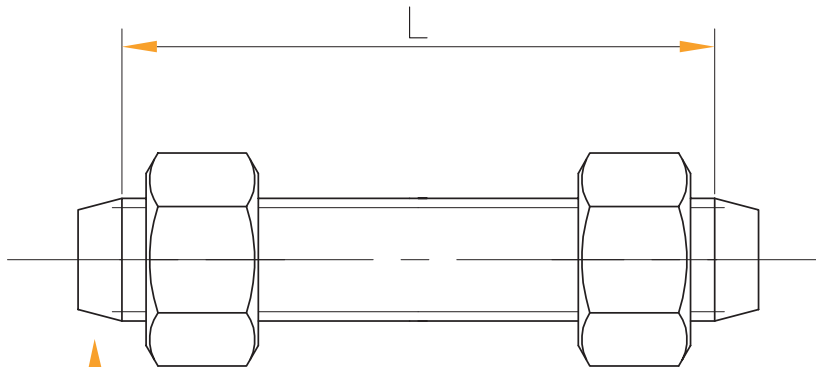




Flange

Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
1/2	95	66,7	5/8	4	1/2
3/4	115	82,6	3/4	4	5/8
1	125	88,9	3/4	4	5/8
1 1/4	135	98,4	3/4	4	5/8
1 1/2	155	114,3	7/8	4	3/4
2	165	127	3/4	8	5/8
2 1/2	190	149,2	7/8	8	3/4
3	210	168,3	7/8	8	3/4
3 1/2	230	184,2	1	8	7/8
4	275	215,9	1	8	7/8
5	330	266,7	1 1/8	8	1
6	355	292,1	1 1/8	12	1
8	420	349,2	1 1/4	12	1 1/8
10	510	431,8	1 3/8	16	1 1/4
12	560	489	1 3/8	20	1 1/4
14	605	527	1 1/2	20	1 3/8
16	685	603,2	1 5/8	20	1 1/2
18	745	654	1 3/4	20	1 5/8
20	815	723,9	1 3/4	24	1 5/8
24	940	838,2	2	24	1 7/8





Point height [Note (1)]
Stud Bolt With Nuts

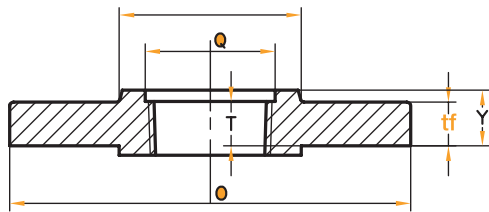
Length of bolts, L		
7-mm raised face	Male and female/tongue and groove	Ring joint
75	70	75
90	85	90
90	85	90
95	90	95
110	100	110
110	100	110
120	115	120
125	120	125
140	135	140
145	140	145
165	160	165
170	165	170
190	185	195
215	210	215
220	215	220
235	230	235
255	250	255
275	265	275
285	280	290
330	325	335

The values, unless otherwise indicated, are to be considered in millimeters

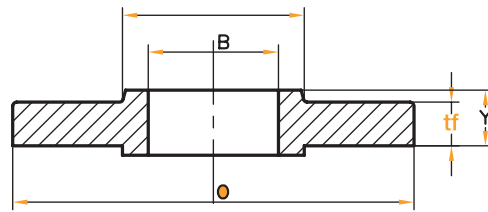
Note 1: The length of the stud bolt does not include the height of the points.



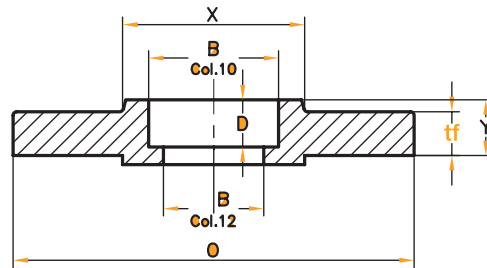
Templates for drilling class 1500 pipe flanges



Threaded

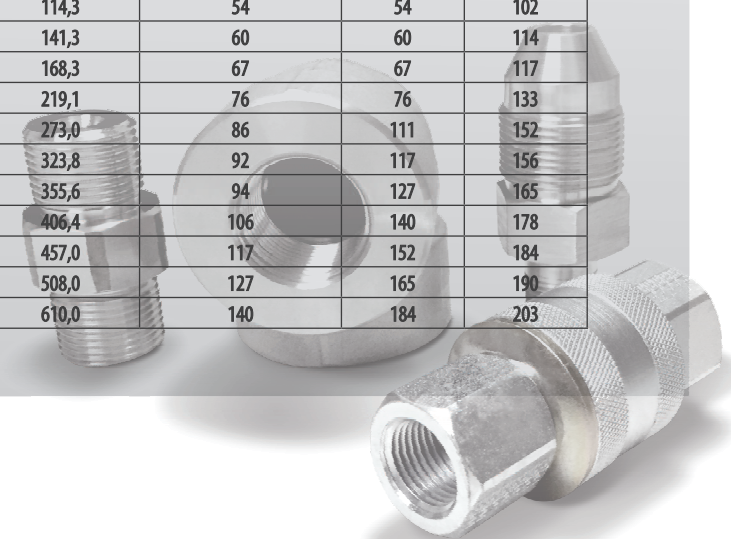


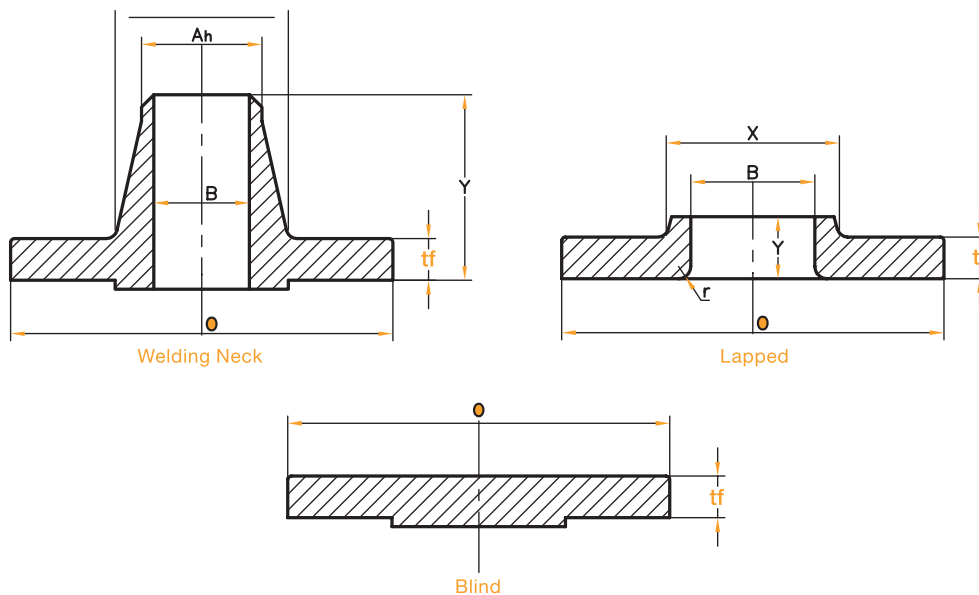
Slip-On Welding



Socket Welding
(NPS 1/2 to 3 Only)

Nominal pipe size (NPS)	Outside diameter of flange, O	Minimum thickness of flange, tf	Diameter of hub, X	Hub diameter beginning of chamfer welding neck, Ah	Length through hub		
					Threaded / slip-on / socket welding, Y	Lapped, Y	Number of bolts.
1/2	95	14,3	38	21,3	22	22	52
3/4	115	15,9	48	26,7	25	25	57
1	125	17,5	54	33,4	27	27	62
1 1/4	135	20,7	64	42,2	29	29	67
1 1/2	155	22,3	70	48,3	32	32	70
2	165	25,4	84	60,3	37	37	73
2 1/2	190	28,6	100	73,9	41	41	79
3	210	31,8	117	88,9	46	46	83
3 1/2	230	35	133	101,6	49	49	86
4	275	38,1	152	114,3	54	54	102
5	330	44,5	189	141,3	60	60	114
6	355	47,7	222	168,3	67	67	117
8	420	55,6	273	219,1	76	76	133
10	510	63,5	343	273,0	86	111	152
12	560	66,7	400	323,8	92	117	156
14	605	69,9	432	355,6	94	127	165
16	685	76,2	495	406,4	106	140	178
18	745	82,6	546	457,0	117	152	184
20	815	88,9	610	508,0	127	165	190
24	940	101,6	718	610,0	140	184	203



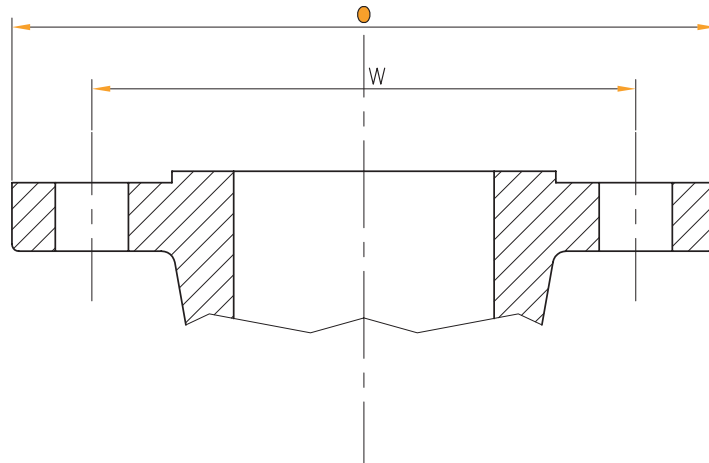


Minimum thread length threaded flange, T	Bore			Corner bore radius of lapped flange and pipe, r	Minimum counterbore threaded flange, Q	Depth of socket, D
	Minimum slip-on/socket welding, B	Minimum lapped, B	Welding neck/socket welding, B			
16	22,2	22,9	To be specified by the purchaser	3	23,6	10
16	27,7	28,2	To be specified by the purchaser	3	29	11
18	34,5	34,9	To be specified by the purchaser	3	35,8	13
21	43,2	43,7	To be specified by the purchaser	5	44,4	14
23	49,5	50,0	To be specified by the purchaser	6	50,6	16
29	61,9	62,5	To be specified by the purchaser	8	63,5	17
32	74,6	75,4	To be specified by the purchaser	8	76,2	19
35	90,7	91,4	To be specified by the purchaser	10	92,2	21
40	103,4	104,1	To be specified by the purchaser	10	104,9	—
42	116,1	116,8	To be specified by the purchaser	11	117,6	—
48	143,8	144,4	To be specified by the purchaser	11	144,4	—
51	170,7	171,4	To be specified by the purchaser	13	171,4	—
—	221,5	222,2	To be specified by the purchaser	13	—	—
—	276,2	277,4	To be specified by the purchaser	13	—	—
—	327	328,2	To be specified by the purchaser	13	—	—
—	359,2	360,2	To be specified by the purchaser	13	—	—
—	410,5	411,2	To be specified by the purchaser	13	—	—
—	461,8	462,3	To be specified by the purchaser	13	—	—
—	513,1	514,4	To be specified by the purchaser	13	—	—
—	616	616	To be specified by the purchaser	13	—	—

The values, unless otherwise indicated, are to be considered in millimeters

Note 1: This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.

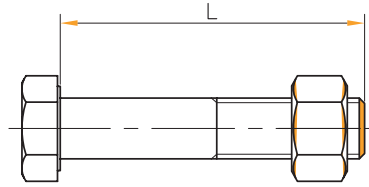




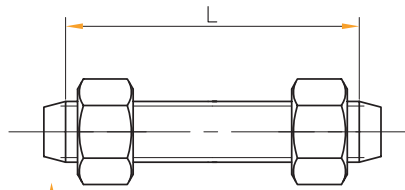
Flange

Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
1/2	90	60,3	5/8	4	1/2
3/4	100	69,9	5/8	4	1/2
1	110	79,4	5/8	4	1/2
1 1/4	115	88,9	5/8	4	1/2
1 1/2	125	98,4	5/8	4	1/2
2	150	120,7	3/4	4	5/8
2 1/2	180	139,7	3/4	4	5/8
3	190	152,4	3/4	4	5/8
3 1/2	215	177,8	3/4	8	5/8
4	230	190,5	3/4	8	5/8
5	255	215,9	7/8	8	3/4
6	280	241,3	7/8	8	3/4
8	345	298,5	7/8	8	3/4
10	405	362,0	1	12	7/8
12	485	431,8	1	12	7/8
14	535	476,3	1 1/8	12	1
16	595	539,8	1 1/8	16	1
18	635	577,9	1 1/4	16	1 1/8
20	700	635,0	1 1/4	20	1 1/8
24	815	749,3	1 3/8	20	1 1/4





Machine Bolt With Nuts

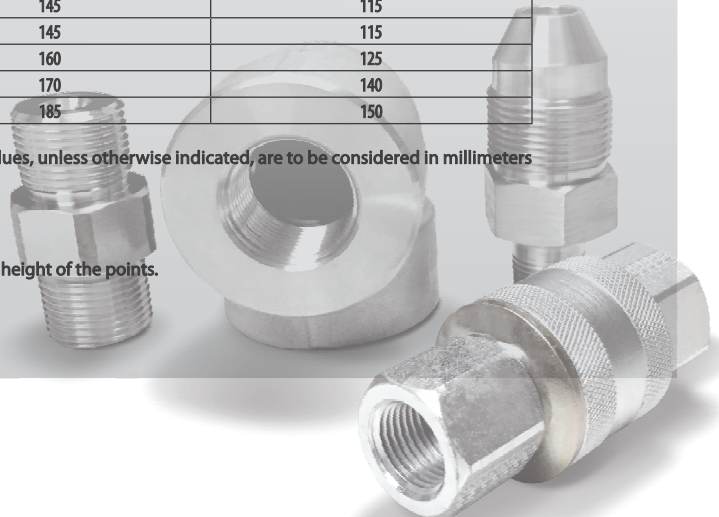


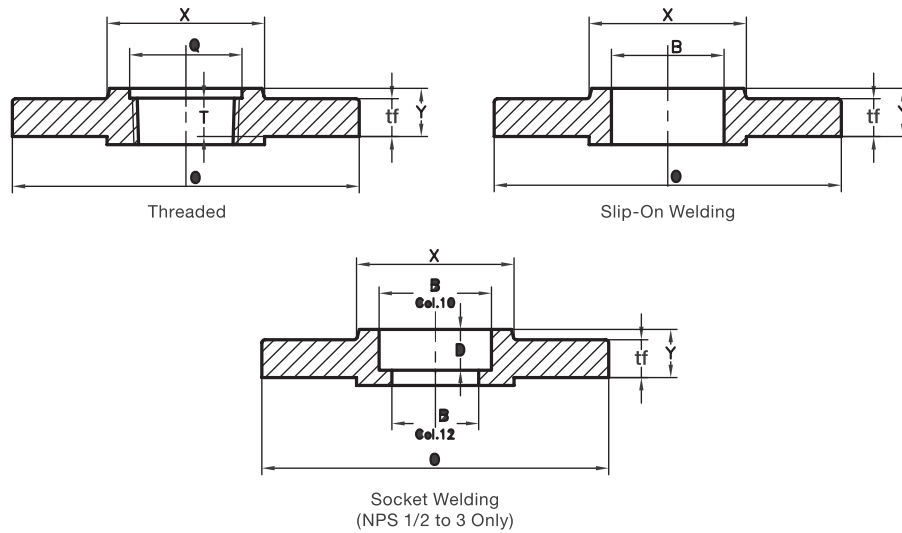
Point height [Note (1)]
Stud Bolt With Nuts

Length of bolts, L		
Stud bolts		Machine bolts
2-mm raised face	Ring joint	2-mm raised face
55	—	50
65	—	50
65	75	55
70	85	55
70	85	65
85	95	70
90	100	75
90	100	75
90	100	75
90	100	75
95	110	85
100	115	85
110	120	90
115	125	100
120	135	100
135	145	115
135	145	115
145	160	125
160	170	140
170	185	150

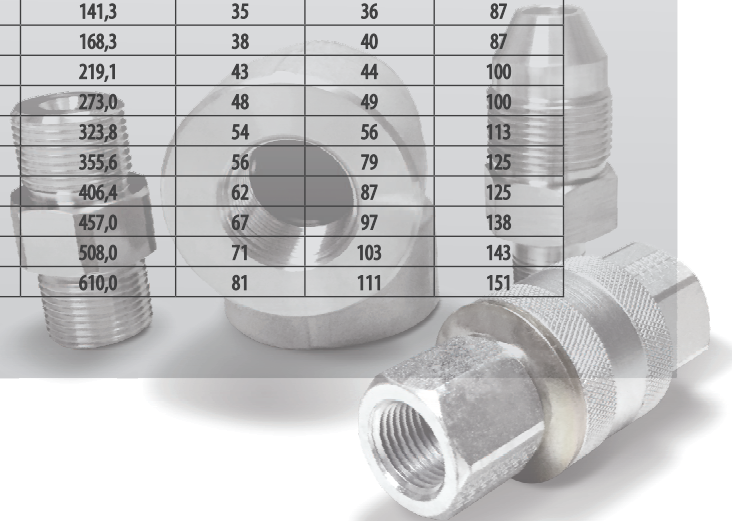
The values, unless otherwise indicated, are to be considered in millimeters

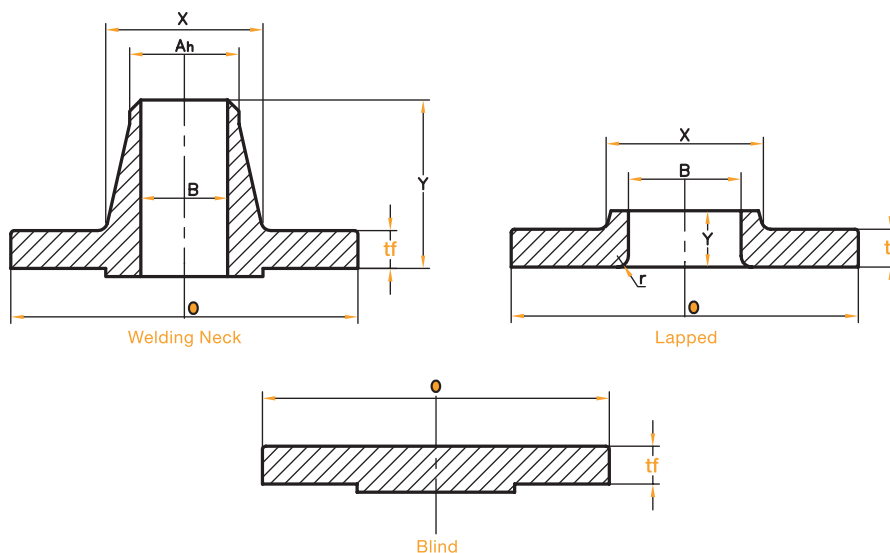
Note 1: The length of the stud bolt does not include the height of the points.





Nominal pipe size (NPS)	Outside diameter of flange, O	Minimum thickness of flange, tf	Minimum thickness lap joint, tf	Diameter of hub, X	Hub diameter beginning of chamfer welding neck, Ah	Length through hub		
						Threaded / slip-on / socket welding, Y	Lapped, Y	Welding neck, Y
1/2	90	9,6	11,2	30	21,3	14	16	46
3/4	100	11,2	12,7	38	26,7	14	16	51
1	110	12,7	14,3	49	33,4	16	17	54
1 1/4	115	14,3	15,9	59	42,2	19	21	56
1 1/2	125	15,9	17,5	65	48,3	21	22	60
2	150	17,5	19,1	78	60,3	24	25	62
2 1/2	180	20,7	22,3	90	73,9	27	29	68
3	190	22,3	23,9	108	88,9	29	30	68
3 1/2	215	22,3	23,9	122	101,6	30	32	70
4	230	22,3	23,9	135	114,3	32	33	75
5	255	22,3	23,9	164	141,3	35	36	87
6	280	23,9	25,4	192	168,3	38	40	87
8	345	27,0	28,6	246	219,1	43	44	100
10	405	28,6	30,2	305	273,0	48	49	100
12	485	30,2	31,8	365	323,8	54	56	113
14	535	33,4	35	400	355,6	56	79	125
16	595	35	36,6	457	406,4	62	87	125
18	635	38,1	39,7	505	457,0	67	97	138
20	700	41,3	42,9	559	508,0	71	103	143
24	815	46,1	47,7	663	610,0	81	111	151



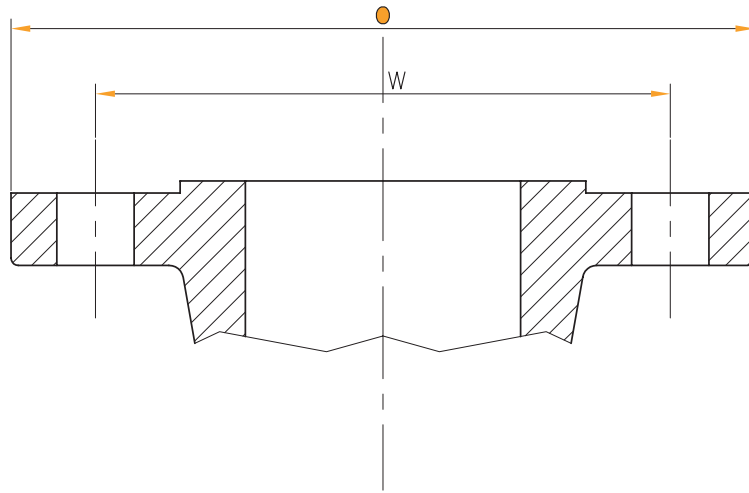


Minimum thread length threaded, T	Bore			Corner bore radius of lapped flange and pipe, r	Depth of socket, D
	Minimum slip-on/socket welding, B	Minimum lapped, B	Welding neck/socket welding, B		
16	22,2	22,9	15,8	3	10
16	27,7	28,2	20,9	3	11
17	34,5	34,9	26,6	3	13
21	43,2	43,7	35,1	5	14
22	49,5	50	40,9	6	16
25	61,9	62,5	52,5	8	17
29	74,6	75,4	62,7	8	19
30	90,7	91,4	77,9	10	21
32	103,4	104,1	90,1	10	—
33	116,1	116,8	102,3	11	—
36	143,8	144,4	128,2	11	—
40	170,7	171,4	154,1	13	—
	221,5	222,2	202,7	13	—
	276,2	277,4	254,6	13	—
	327	328,2	304,8	13	—
	359,2	360,2	To be specified by the purchaser	13	—
	410,5	411,2	To be specified by the purchaser	13	—
	461,8	462,3	To be specified by the purchaser	13	—
	513,1	514,4	To be specified by the purchaser	13	—
	616	616	To be specified by the purchaser	13	—

The values, unless otherwise indicated, are to be considered in millimeters

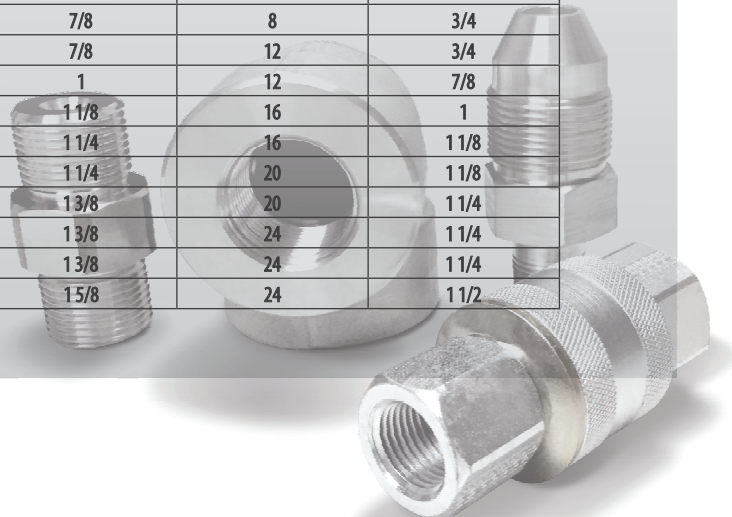
Note 1: This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.

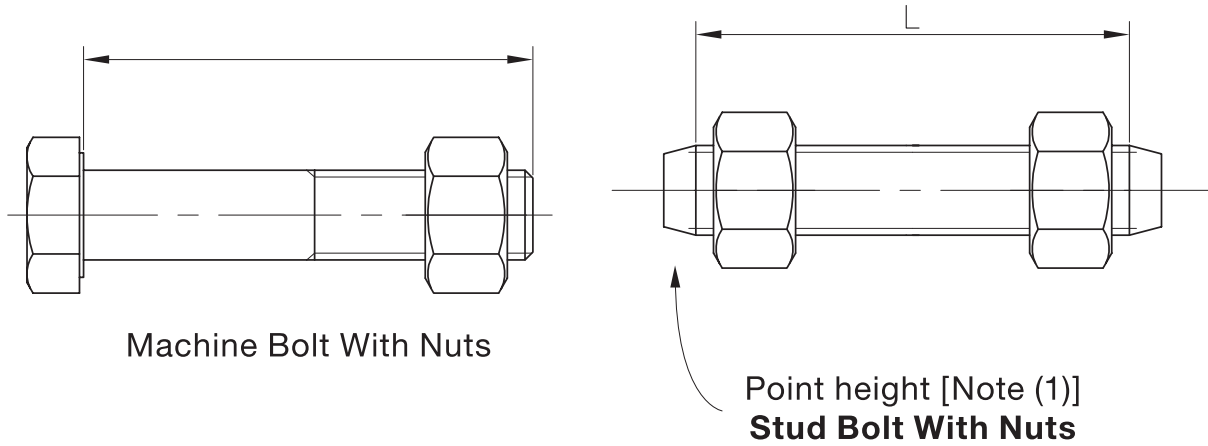




Flange

Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
1/2	95	66,7	5/8	4	1/2
3/4	115	82,6	3/4	4	5/8
1	125	88,9	3/4	4	5/8
1 1/4	135	98,4	3/4	4	5/8
1 1/2	155	114,3	7/8	4	3/4
2	165	127,0	3/4	8	5/8
2 1/2	190	149,2	7/8	8	3/4
3	210	168,3	7/8	8	3/4
3 1/2	230	184,2	7/8	8	3/4
4	255	200,0	7/8	8	3/4
5	280	235,0	7/8	8	3/4
6	320	269,9	7/8	12	3/4
8	380	330,2	1	12	7/8
10	445	387,4	1 1/8	16	1
12	520	450,8	1 1/4	16	1 1/8
14	585	514,4	1 1/4	20	1 1/8
16	650	571,5	1 3/8	20	1 1/4
18	710	628,6	1 3/8	24	1 1/4
20	775	685,8	1 3/8	24	1 1/4
24	915	812,8	1 5/8	24	1 1/2





Length of bolts, L		
Stud bolts		Machine bolts
2-mm raised face	Ring Joint	2-mm raised face
65	75	55
75	90	65
75	90	65
85	95	70
90	100	75
90	100	75
100	115	85
110	120	90
110	125	95
115	125	95
120	135	110
120	140	110
140	150	120
160	170	140
170	185	145
180	190	160
190	205	165
195	210	170
205	220	185
230	255	205

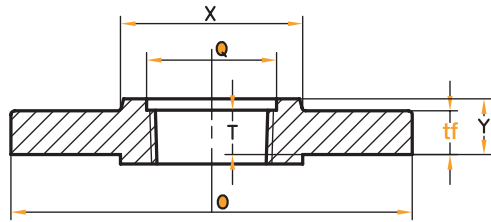
The values, unless otherwise indicated, are to be considered in millimeters

Note 1: The length of the stud bolt does not include the height of the points.

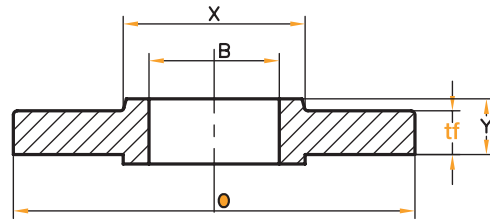




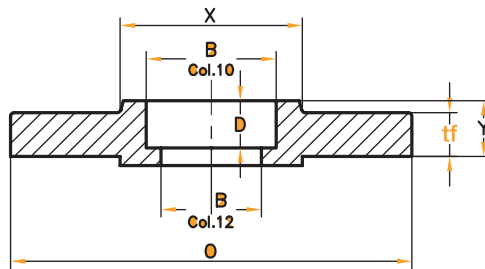
Templates for drilling class 1500 pipe flanges



Threaded

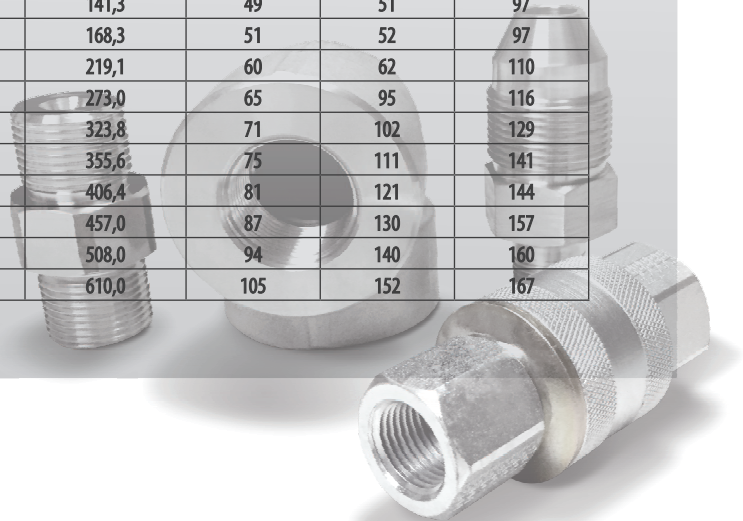


Slip-On Welding



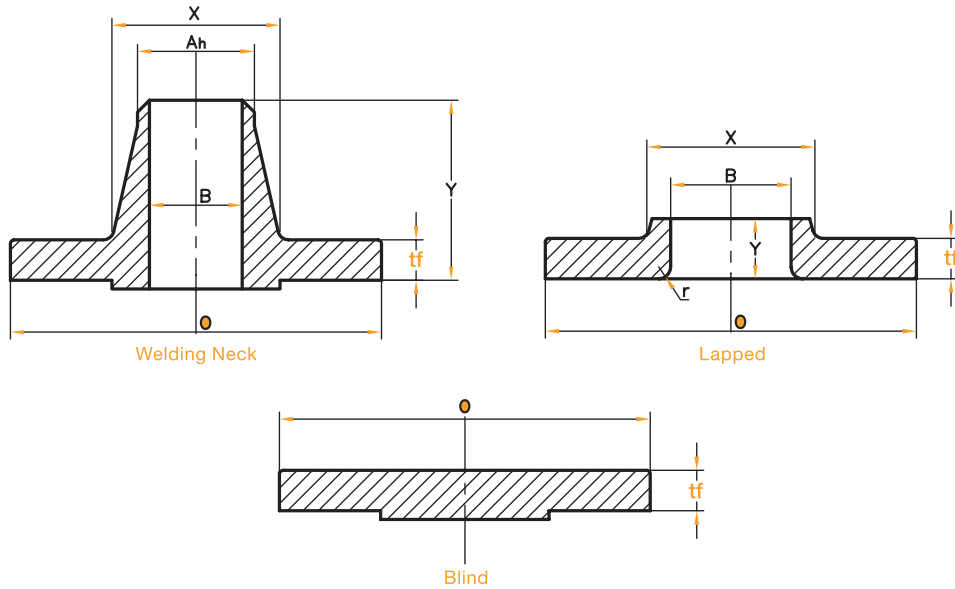
Socket Welding
(NPS 1/2 to 3 Only)

Nominal pipe size (NPS)	Outside diameter of flange, O	Minimum thickness of flange, tf	Minimum thickness lap joint, tf	Diameter of hub, X	Hub diameter beginning of chamfer welding neck, Ah	Length through hub		
						Threaded / slip-on / socket welding, Y	Lapped, Y	Welding neck, Y
1/2	95	12,7	14,3	38	21,3	21	22	51
3/4	115	14,3	15,9	48	26,7	24	25	56
1	125	15,9	17,5	54	33,4	25	27	60
1 1/4	135	17,5	19,1	64	42,2	25	27	64
1 1/2	155	19,1	20,7	70	48,3	29	30	67
2	165	20,7	22,3	84	60,3	32	33	68
2 1/2	190	23,9	25,4	100	73,9	37	38	75
3	210	27	28,6	117	88,9	41	43	78
3 1/2	230	28,6	30,2	133	101,6	43	44	79
4	255	30,2	31,8	146	114,3	46	48	84
5	280	33,4	35	178	141,3	49	51	97
6	320	35,0	36,6	206	168,3	51	52	97
8	380	39,7	41,3	260	219,1	60	62	110
10	445	46,1	47,7	321	273,0	65	95	116
12	520	49,3	50,8	375	323,8	71	102	129
14	585	52,4	54	425	355,6	75	111	141
16	650	55,6	57,2	483	406,4	81	121	144
18	710	58,8	60,4	533	457,0	87	130	157
20	775	62	63,5	587	508,0	94	140	160
24	915	68,3	69,9	702	610,0	105	152	167





Templates for drilling class 1500 pipe flanges

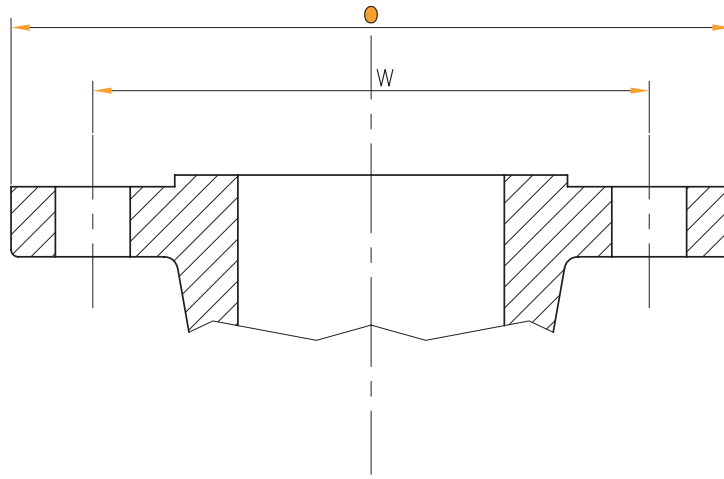


Minimum thread length threaded, T	Bore			Corner bore radius of lapped flange and pipe, r	Depth of socket, D	Depth of socket, D
	Minimum slip-on/socket welding, B	Minimum lapped, B	Welding neck/socket welding, B			
16	22,2	22,9	15,8	3	23,6	10
16	27,7	28,2	20,9	3	29	11
18	34,5	34,9	26,6	3	35,8	13
21	43,2	43,7	35,1	5	44,4	14
23	49,5	50	40,9	6	50,3	16
29	61,9	62,5	52,5	8	63,5	17
32	74,6	75,4	62,7	8	76,2	19
32	90,7	91,4	77,9	10	92,2	21
37	103,4	104,1	90,1	10	104,9	—
37	116,1	116,8	102,3	11	117,6	—
43	143,8	144,4	128,2	11	144,4	—
47	170,7	171,4	154,1	13	171,4	—
	221,5	222,2	202,7	13	222,2	—
	276,2	277,4	254,6	13	276,2	—
	327	328,2	304,8	13	328,6	—
	359,2	360,2	To be specified by the purchaser	13	360,4	—
	410,5	411,2	To be specified by the purchaser	13	411,2	—
	461,8	462,3	To be specified by the purchaser	13	462	—
	513,1	514,4	To be specified by the purchaser	13	512,8	—
	616	616	To be specified by the purchaser	13	614,4	—

The values, unless otherwise indicated, are to be considered in millimeters

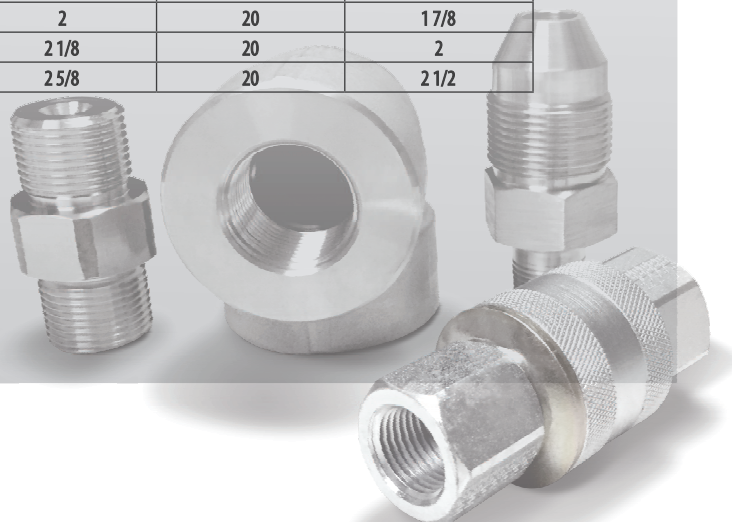
Note 1: This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.

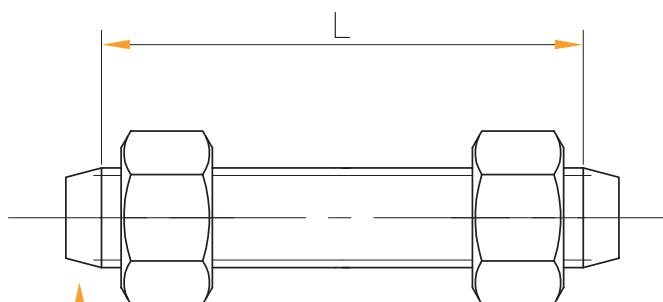




Flange

Nominal pipe size (NPS)	Outside diameter of flange, O	Drilling			
		Diameter of bolt circle, W	Diameter of bolt holes, IN.	Number of bolts.	Diameter of bolts, IN.
3	240	190,5	1	8	7/8
4	290	235,0	1 1/4	8	1 1/8
5	350	279,4	1 3/8	8	1 1/4
6	380	317,5	1 1/4	12	1 1/8
8	470	393,7	1 1/2	12	1 3/8
10	545	469,9	1 1/2	16	1 3/8
12	610	533,4	1 1/2	20	1 3/8
14	640	558,8	1 5/8	20	1 1/2
16	705	616,0	1 3/4	20	1 5/8
18	785	685,8	2	20	1 7/8
20	855	749,3	2 1/8	20	2
24	1040	901,7	2 5/8	20	2 1/2



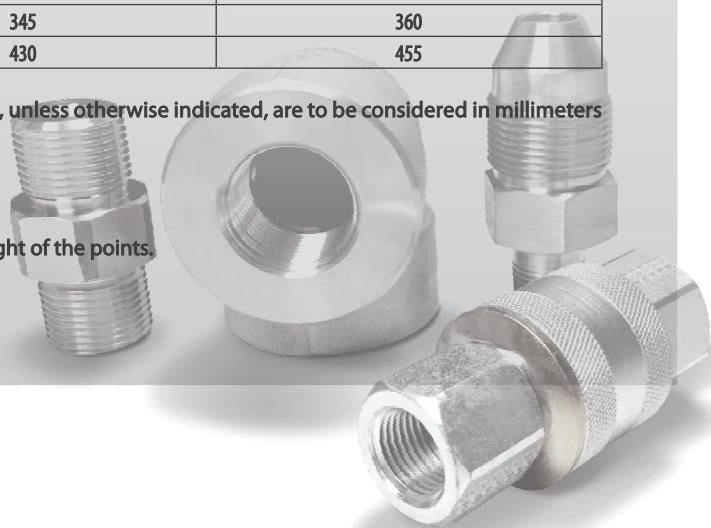


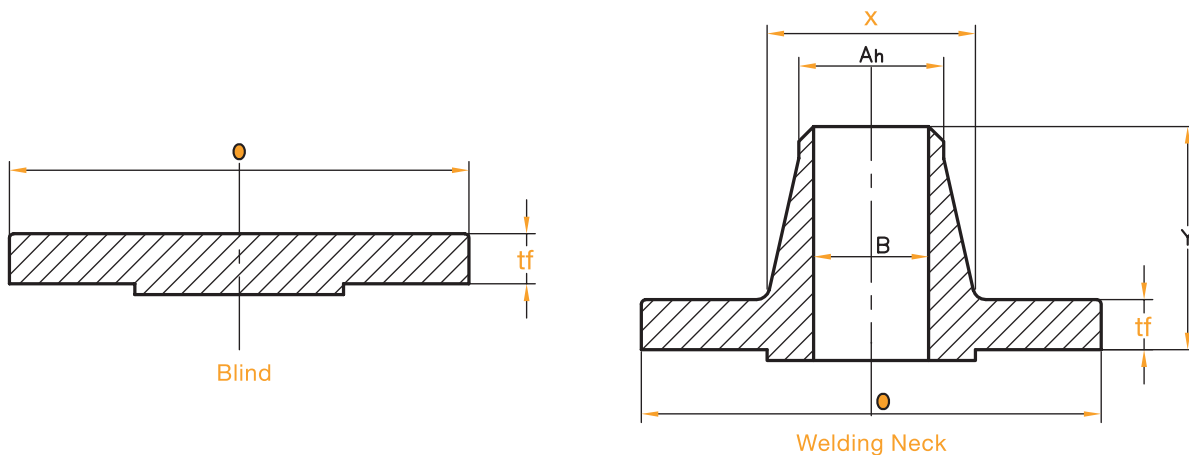
**Point height [Note (1)]
Stud Bolt With Nuts**

Length of bolts, L		
7-mm raised face	Male and female/tongue and groove	Ring joint
145	140	145
170	165	170
190	185	190
190	185	195
220	215	220
235	230	235
255	250	255
275	265	280
285	280	290
325	320	335
350	345	360
440	430	455

The values, unless otherwise indicated, are to be considered in millimeters

Note 1: The length of the stud bolt does not include the height of the points.

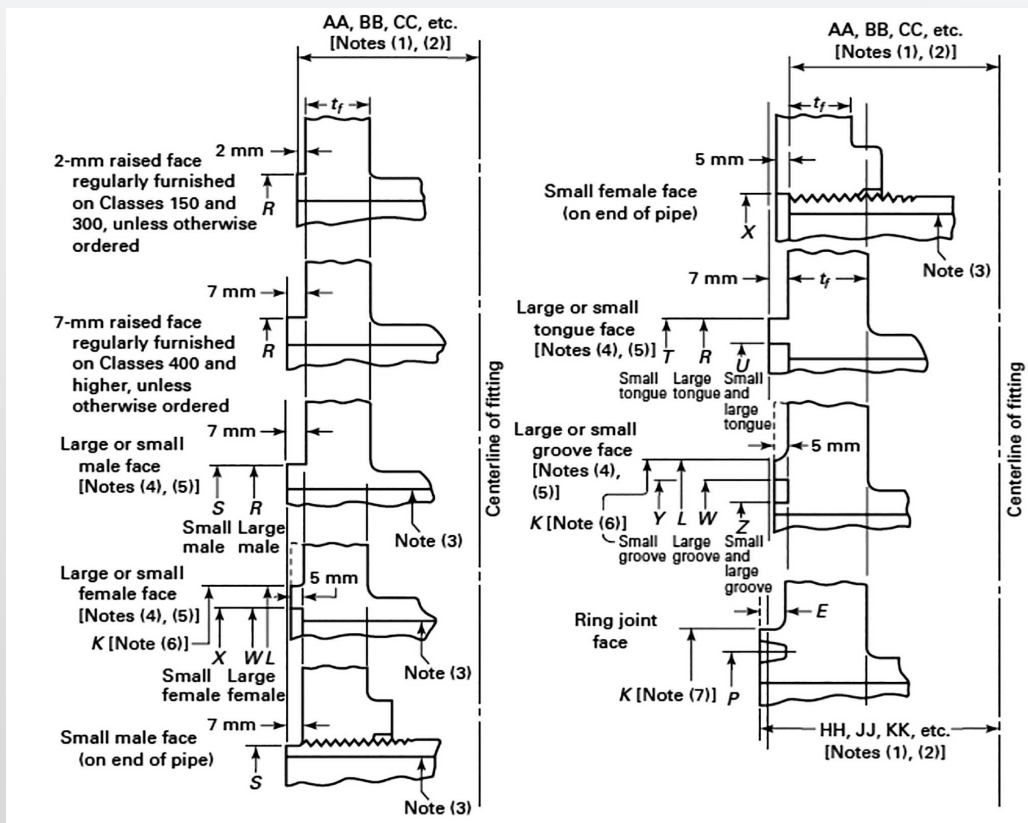




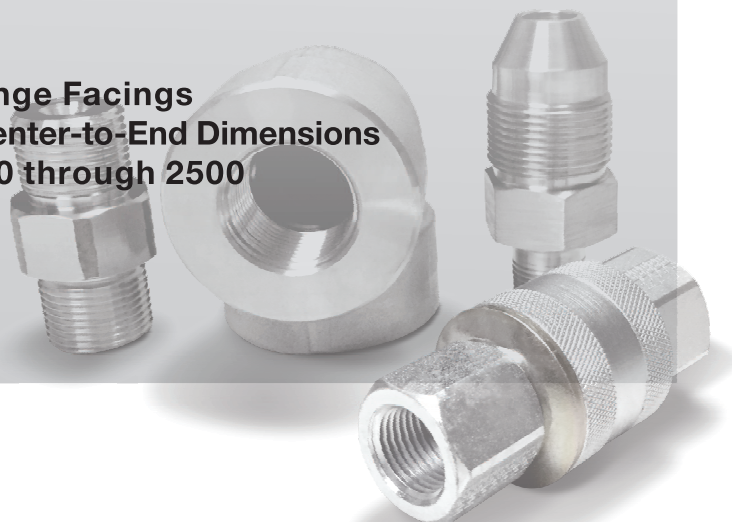
Nominal pipe size (NPS)	Outside diameter of flange, O	Minimum thickness of flange, tf	Diameter of hub, x	Hub diameter beginning of chamfer welding neck, Ah	Welding neck, Y	Welding neck, B
3	240	38,1	127	88,9	102	To be specified by the purchaser
4	290	44,5	159	114,3	114	To be specified by the purchaser
5	350	50,8	190	141,3	127	To be specified by the purchaser
6	380	55,6	235	168,3	140	To be specified by the purchaser
8	470	63,5	298	219,1	162	To be specified by the purchaser
10	545	69,9	368	273,0	184	To be specified by the purchaser
12	610	79,4	419	323,8	200	To be specified by the purchaser
14	640	85,8	451	355,6	213	To be specified by the purchaser
16	705	88,9	508	406,4	216	To be specified by the purchaser
18	785	101,6	565	457,0	229	To be specified by the purchaser
20	855	108	622	508,0	248	To be specified by the purchaser
24	1040	139,7	749	610,0	292	To be specified by the purchaser

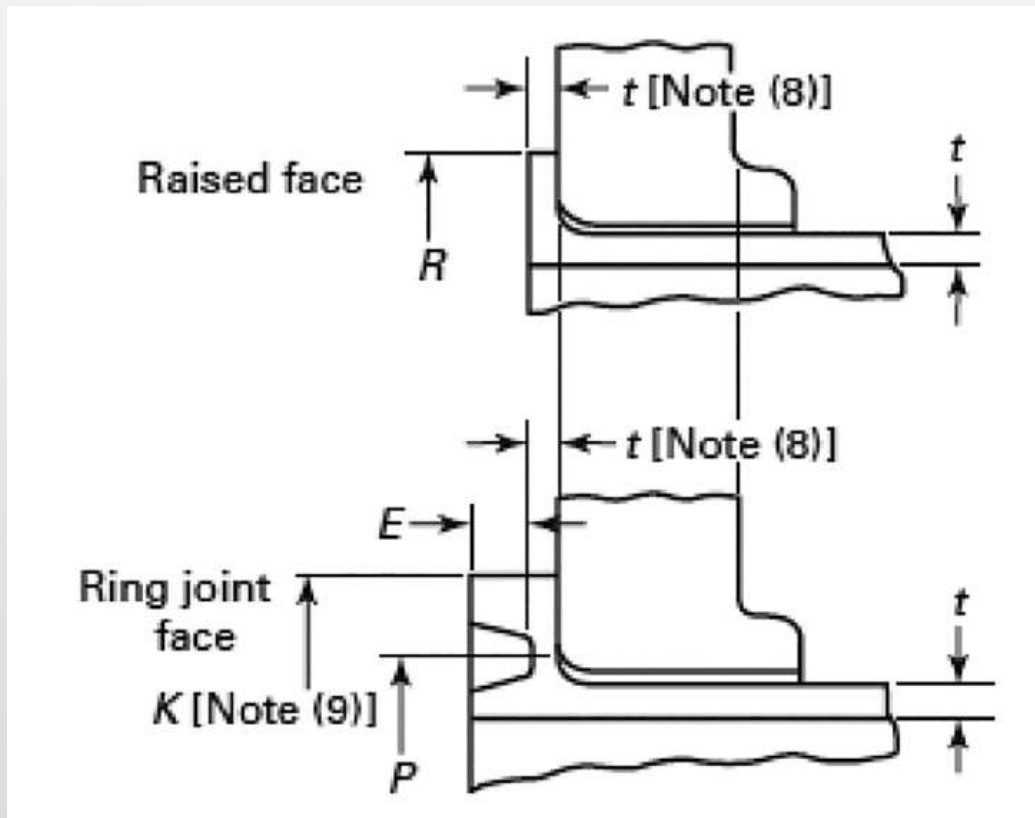
The values, unless otherwise indicated, are to be considered in millimeters



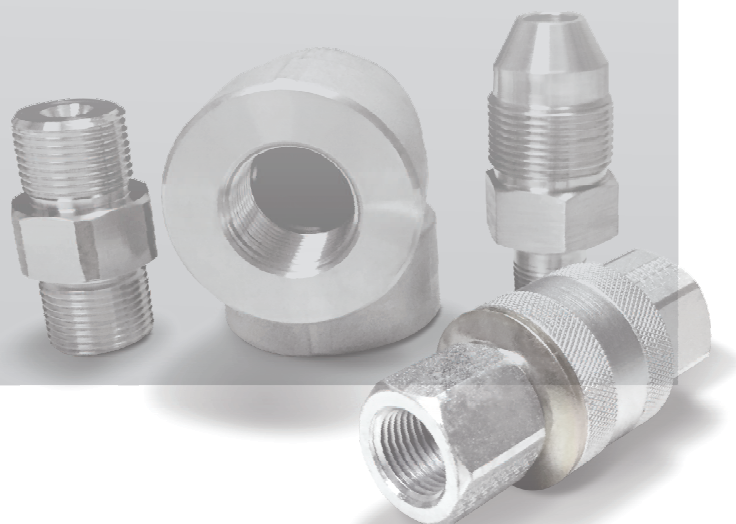


End Flange Facings
Flange Thickness and Center-to-End Dimensions
Classes 150 through 2500



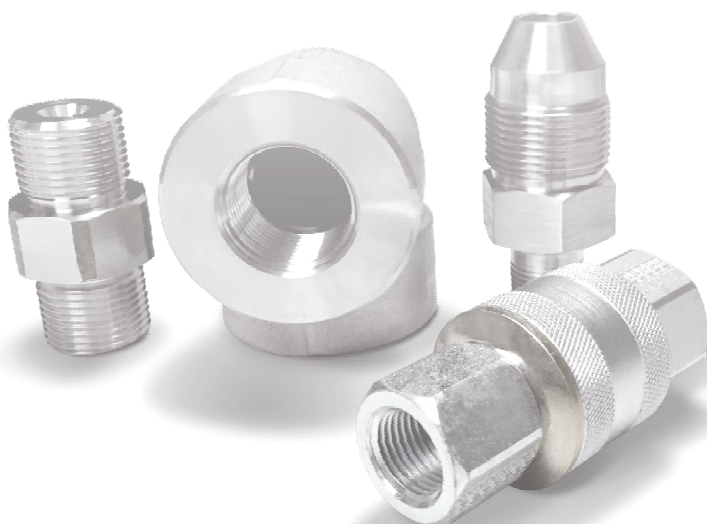


End Flange Facings
Flange Thickness and End-to-End Dimensions
Lapped Joints





Nominal pipe size (NPS)	Outside diameter				Inside diameter of small tongue [note 1]	Outside diameter		
	Raised face large male and large tongue, R	Small male, S [note 1]	Small tongue, T	Inside diameter of large and small tongue, U		Large female and large groove, W	Small female, X [note 1]	Small groove, Y
1/2	34,9	18,3	35,1	25,4	—	36,5	19,9	36,5
3/4	42,9	23,8	42,9	33,3	—	44,4	25,4	44,4
1	50,8	30,2	47,8	38,1	—	52,4	31,8	49,2
1 1/4	63,5	38,1	57,2	47,6	—	65,1	39,7	58,7
1 1/2	73	44,4	63,5	54	—	74,6	46	65,1
2	92,1	57,2	82,6	73	—	93,7	58,8	84,1
2 1/2	104,8	68,3	95,2	85,7	—	106,4	69,8	69,8
3	127	84,1	117,5	108	—	128,6	85,7	119,1
3 1/2	139,7	96,8	130,2	120,6	—	141,3	98,4	131,8
4	157,2	109,5	144,5	131,8	—	158,8	111,1	146
5	185,7	136,5	173	160,3	—	187,3	138,1	174,6
6	215,9	161,9	203,2	190,5	—	217,5	163,5	204,8
8	269,9	212,7	254	238,1	—	271,5	214,3	255,6
10	323,8	266,7	304,8	285,8	—	325,4	268,3	306,4
12	381	317,5	362	342,9	—	382,6	319,1	363,5
14	412,8	349,2	393,7	374,6	—	414,3	350,8	395,3
16	469,9	400	447,5	425,4	—	471,5	401,6	449,3
18	533,4	450,8	511,2	489	—	535	452,4	512,8
20	584,2	501,6	558,8	533,4	—	585,8	503,2	560,4
24	692,2	603,2	666,8	641,4	—	693,7	604,8	668,3





Inside diameter of large and small groove, Z	Height		Depth of groove or female [notes 1, 5]	Minimum outside diameter of raised portion [notes 6, 7]		Nominal pipe size (NPS)
	Raised face [notes 2,3]	Large and small male and tongue [notes 2,4]		Small female and groove, K	Large female and groove, L	
23,8	---	---	---	44	46	1/2
31,8	---	---	---	52	54	3/4
36,5	---	---	---	57	62	1
46	---	---	---	67	75	1 1/4
52,4	---	---	---	73	84	1 1/2
71,4	---	---	---	92	103	2
84,1	---	---	---	105	116	2 1/2
106,4	---	---	---	127	138	3
119,1	---	---	---	140	151	3 1/2
130,2	---	---	---	157	168	4
158,8	---	---	---	186	197	5
188,9	---	---	---	216	227	6
236,5	---	---	---	270	281	8
284,2	---	---	---	324	335	10
341,3	---	---	---	381	392	12
373,1	---	---	---	413	424	14
423,9	---	---	---	470	481	16
487,4	---	---	---	533	544	18
531,8	---	---	---	584	595	20
639,8	---	---	---	692	703	24

The values, unless otherwise indicated, are to be considered in millimeters

Note 1: For small male and female joints, care should be taken in the use of these dimensions to ensure that the inside diameter of the fitting or pipe is small enough to permit sufficient bearing surface to prevent the crushing of the gasket. This applies particularly on lines where the joint is made on the end of the pipe. The inside diameter of the fitting should match the inside diameter of the pipe as specified by the purchases. Threaded companion flanges for small male and female joints are furnished with plain face and are threaded with American National Standard Locknut Thread (NPSL).

Note 2: See para. 6.4.3 and Fig. 7 of ASME B 16.5 for thickness and outside diameters of laps.

Note 3: The height of the raised face is either 2 mm or 7 mm (see para. 6.4.1).

Note 4: The height of the large and small male and tongue is 7 mm.

Note 5: The depth of the groove or female is 5 mm.

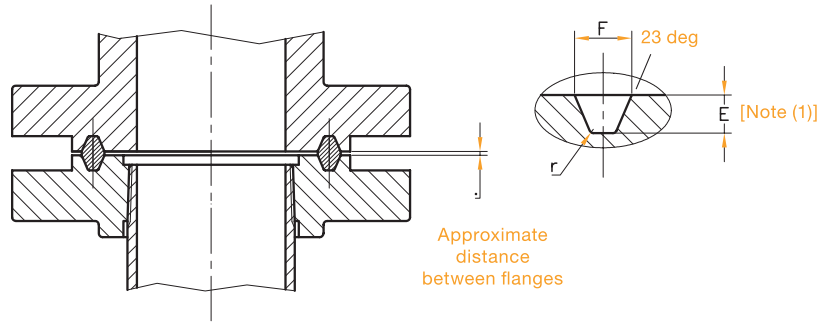
Note 6: The raised portion of the full face may be furnished unless otherwise specified on order.

Note 7: Large male and female faces and large tongue and groove are not applicable to Class 150 because of potential dimensional conflicts.

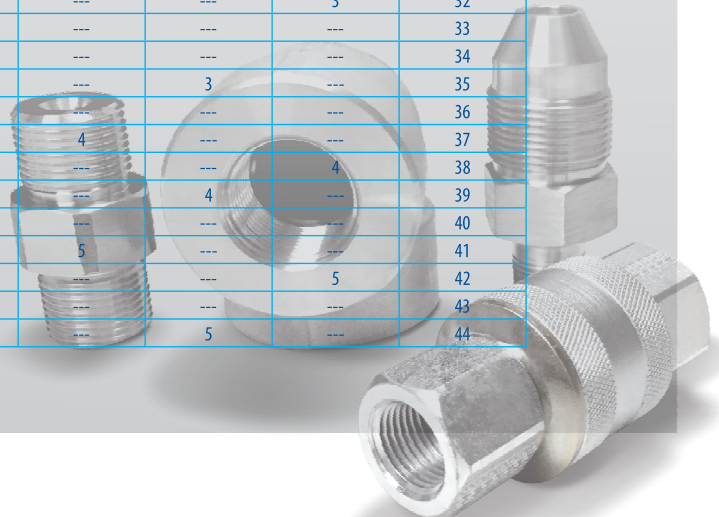


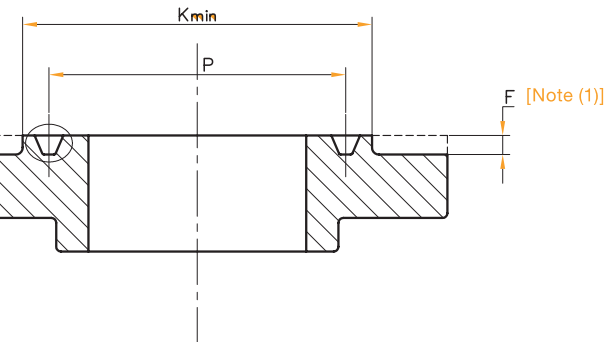


Templates for drilling class 1500 pipe flanges



Nominal pipe size (NPS)							Groove number
Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500	
---	1/2	---	1/2	---	---	---	R11
---	---	---	---	---	1/2	---	12
---	3/4	---	3/4	---	---	1/2	13
---	---	---	---	---	3/4	---	14
1	---	---	---	---	---	---	15
---	1	---	1	---	1	3/4	16
1 1/4	---	---	---	---	---	---	17
---	1 1/4	---	1 1/4	---	1 1/4	1	18
1 1/2	---	---	---	---	---	---	19
---	1 1/2	---	1 1/2	---	1 1/2	---	20
---	---	---	---	---	---	1 1/4	21
2	---	---	---	---	---	---	22
---	2	---	2	---	---	1 1/2	23
---	---	---	---	---	2	---	24
2 1/2	---	---	---	---	---	---	25
---	2 1/2	---	2 1/2	---	---	2	26
---	---	---	---	---	2 1/2	---	27
---	---	---	---	---	---	2 1/2	28
3	---	---	---	---	---	---	29
---	[NOTE 2]	---	[NOTE 2]	---	---	---	30
---	3 [NOTE 2]	---	3 [NOTE 2]	3	---	---	31
---	---	---	---	---	---	3	32
3 1/2	---	---	---	---	---	---	33
---	3 1/2	---	3 1/2	---	---	---	34
---	---	---	---	---	3	---	35
4	---	---	---	---	---	---	36
---	4	4	4	4	---	---	37
---	---	---	---	---	---	4	38
---	---	---	---	---	4	---	39
5	---	---	---	---	---	---	40
---	5	5	5	5	---	---	41
---	---	---	---	---	---	5	42
6	---	---	---	---	---	---	43
---	---	---	---	---	5	---	44





Groove dimensions				Diameter of raised portion, K					Approximate distance between flanges						
Pitch diameter, P	Depth, E [note 1]	Width, F	Radius at bottom, r	Class 150	Class 300 400 600	Class 900	Class 1500	Class 2500	Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
34,14	5,54	7,14	0,8	—	51	—	—	—	—	3	—	3	—	—	—
39,67	6,35	8,74	0,8	—	—	—	60,5	—	—	—	—	—	—	4	—
42,88	6,35	8,74	0,8	—	63,5	—	—	65	—	4	—	4	—	—	—
44,45	6,35	8,74	0,8	—	—	—	66,5	—	—	—	—	—	—	4	—
47,63	6,35	8,74	0,8	63,5	—	—	—	—	4	—	—	—	—	—	—
50,8	6,35	8,74	0,8	—	70	—	71,5	73	—	4	—	4	—	4	—
57,15	6,35	8,74	0,8	73	—	—	—	—	4	—	—	—	—	—	—
60,33	6,35	8,74	0,8	—	79,5	—	81	82,5	—	4	—	4	—	4	—
65,07	6,35	8,74	0,8	—	82,5	—	—	—	4	—	—	—	—	—	—
68,27	6,35	8,74	0,8	—	90,5	—	92	—	—	4	—	4	—	4	—
72,23	7,92	11,91	0,8	—	—	—	—	102	—	—	—	—	—	—	—
82,55	6,35	8,74	0,8	102	—	—	—	—	4	—	—	—	—	—	—
82,55	7,92	11,91	0,8	—	108	—	—	114	—	6	—	5	—	—	—
95,25	7,92	11,91	0,8	—	—	—	124	—	—	—	—	—	—	—	3
101,6	6,35	8,74	0,8	121	—	—	—	—	4	—	—	—	—	—	—
101,6	7,92	11,91	0,8	—	127	—	—	133	—	6	—	5	—	—	—
107,95	7,92	11,91	0,8	—	—	—	137	—	—	—	—	—	—	—	3
111,13	9,53	13,49	1,5	—	—	—	—	149	—	—	—	—	—	—	—
114,3	6,35	8,74	0,8	133	—	—	—	—	4	—	—	—	—	—	—
117,48	7,92	11,91	0,8	—	—	—	—	—	—	—	—	—	—	—	—
123,83	7,92	11,91	0,8	—	146	156	—	—	—	6	—	5	4	—	—
127	9,53	13,49	1,5	—	—	—	—	168	—	—	—	—	—	—	—
131,78	6,35	8,74	0,8	154	—	—	—	—	4	—	—	—	—	—	—
131,78	7,92	11,91	0,8	—	159	—	—	—	—	6	—	5	—	—	—
136,53	7,92	11,91	0,8	—	—	—	168	—	—	—	—	—	—	—	3
149,23	6,35	8,74	0,8	171	—	—	—	—	4	—	—	—	—	—	—
149,23	7,92	11,91	0,8	—	175	181	—	—	—	6	6	5	4	—	—
157,18	11,13	16,66	1,5	—	—	—	—	203	—	—	—	—	—	—	—
161,93	7,92	11,91	0,8	—	—	—	194	—	—	—	—	—	—	—	3
171,45	6,35	8,74	0,8	194	—	—	—	—	4	—	—	—	—	—	—
180,98	7,92	11,91	0,8	—	210	216	—	—	—	6	6	5	4	—	—
190,5	12,7	19,84	1,5	—	—	—	—	241	—	—	—	—	—	—	—
193,68	6,35	8,74	0,8	219	—	—	—	—	4	—	—	—	—	—	—
193,68	7,92	11,91	0,8	—	—	—	229	—	—	—	—	—	—	—	3





Nominal pipe size (NPS)							Groove number
Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500	
---	6	6	6	6	---	---	45
---	---	---	---	---	6	---	46
---	---	---	---	---	---	6	47
8	---	---	---	---	---	---	48
---	8	8	8	8	---	---	49
---	---	---	---	---	8	---	50
---	---	---	---	---	---	8	51
10	---	---	---	---	---	---	52
---	10	10	10	10	---	---	53
---	---	---	---	---	10	---	54
---	---	---	---	---	---	10	55
12	---	---	---	---	---	---	56
---	12	12	12	12	---	---	57
---	---	---	---	---	12	---	58
14	---	---	---	---	---	---	59
---	---	---	---	---	---	12	60
---	14	14	14	---	---	---	61
---	---	---	---	14	---	---	62
---	---	---	---	---	14	---	63
16	---	---	---	---	---	---	64
---	16	16	16	---	---	---	65
---	---	---	---	16	---	---	66
---	---	---	---	---	16	---	67
18	---	---	---	---	---	---	68
---	18	18	18	---	---	---	69
---	---	---	---	18	---	---	70
---	---	---	---	---	18	---	71
20	---	---	---	---	---	---	72
---	20	20	20	---	---	---	73
---	---	---	---	20	---	---	74
---	---	---	---	---	20	---	75
24	---	---	---	---	---	---	76
---	24	24	24	---	---	---	77
---	---	---	---	---	---	---	78
---	---	---	---	---	24	---	79



Groove dimensions			Radius at bottom, r	Diameter of raised portion, K					Approximate distance between flanges						
Pitch diameter, P	Depth, E [note 1]	Width, F		Class 150	Class 300 400 600	Class 900	Class 1500	Class 2500	Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
211,12	7,92	11,91	0,8	—	241	241	—	—	—	6	6	5	4	—	—
211,14	9,53	13,49	1,5	—	—	—	248	—	—	—	—	—	—	3	—
228,6	12,7	19,84	1,5	—	—	—	—	279	—	—	—	—	—	—	4
247,65	6,35	8,74	0,8	273	—	—	—	—	4	—	—	—	—	—	—
269,88	7,92	11,91	0,8	—	302	308	—	—	—	6	6	5	4	—	—
269,88	11,13	16,66	1,5	—	—	—	318	—	—	—	—	—	—	4	—
279,4	14,27	23,01	1,5	—	—	—	—	340	—	—	—	—	—	—	5
304,8	6,35	8,74	0,8	330	—	—	—	—	4	—	—	—	—	—	—
323,85	7,92	11,91	0,8	—	356	362	—	—	—	6	6	5	4	—	—
323,85	11,13	16,66	1,5	—	—	—	371	—	—	—	—	—	—	4	—
342,9	17,48	30,18	2,4	—	—	—	—	425	—	—	—	—	—	—	6
381	6,35	8,74	0,8	406	—	—	—	—	4	—	—	—	—	—	—
381	7,92	11,91	0,8	—	413	419	—	—	—	6	6	5	4	—	—
381	14,27	23,01	1,5	—	—	—	438	—	—	—	—	—	—	5	—
396,88	6,35	8,74	0,8	425	—	—	—	—	3	—	—	—	—	—	—
406,4	17,48	33,32	2,4	—	—	—	—	495	—	—	—	—	—	—	8
419,1	7,92	11,91	0,8	—	457	—	—	—	—	6	6	5	—	—	—
419,1	11,13	16,66	1,5	—	—	467	—	—	—	—	—	—	4	—	—
419,1	15,88	26,97	2,4	—	—	—	489	—	—	—	—	—	—	6	—
454,03	6,35	8,74	0,8	483	—	—	—	—	3	—	—	—	—	—	—
469,9	7,92	11,91	0,8	—	508	—	—	—	—	6	6	5	—	—	—
469,9	11,13	16,66	1,5	—	—	524	—	—	—	—	—	—	4	—	—
469,9	17,48	30,18	2,4	—	—	—	546	—	—	—	—	—	—	8	—
517,53	6,35	8,74	0,8	546	—	—	—	—	3	—	—	—	—	—	—
533,4	7,92	11,91	0,8	—	575	—	—	—	—	6	6	5	—	—	—
533,4	12,7	19,84	1,5	—	—	594	—	—	—	—	—	—	5	—	—
533,4	17,48	30,18	2,4	—	—	—	613	—	—	—	—	—	—	8	—
558,8	6,35	8,74	0,8	597	—	—	—	—	3	—	—	—	—	—	—
584,2	9,53	13,49	1,5	—	635	—	—	—	—	6	6	5	—	—	—
584,2	12,7	19,84	1,5	—	—	648	—	—	—	—	—	—	5	—	—
584,2	17,48	33,32	2,4	—	—	—	673	—	—	—	—	—	—	10	—
673,1	6,35	8,74	0,8	711	—	—	—	—	3	—	—	—	—	—	—
692,15	11,13	16,66	1,5	—	749	—	—	—	—	6	6	6	—	—	—
692,15	15,88	26,97	2,4	—	—	772	—	—	—	—	—	—	6	—	—
692,15	20,62	36,53	2,4	—	—	—	794	—	—	—	—	—	—	11	—

The values, unless otherwise indicated, are to be considered in millimeters.

Note 1: The height of the raised portion is equal to the depth of the groove dimension, E, but is not subjected to the tolerances for E. Former full-face contour may be used.

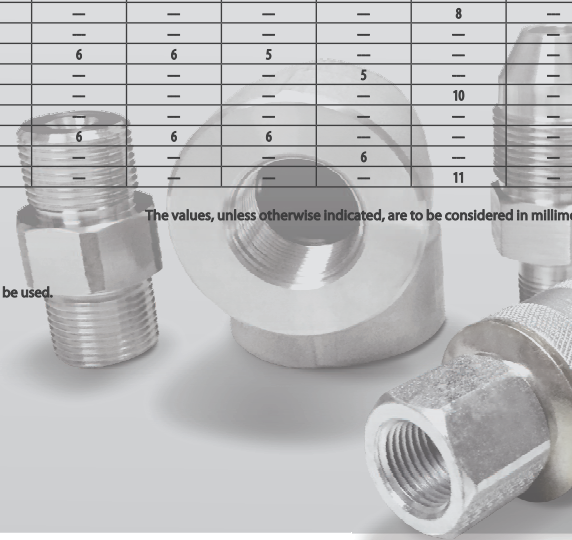
Note 2: For ring joints with lapped flanges in Classes 300 and 600, ring and groove number R30 is used instead of R31.

Tolerances: E (depth) +0,04 / -0,0

Width F
Pitch P
Radius R

R ≤ 2 +0,8 / -0,0
R > 2 ±0,8

leg 23



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