
Dodson
Valco

Contents

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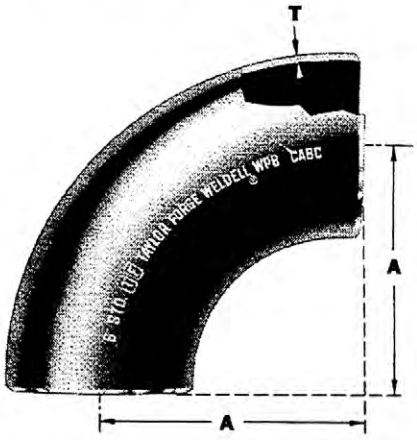
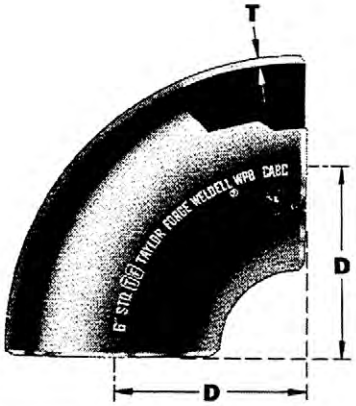
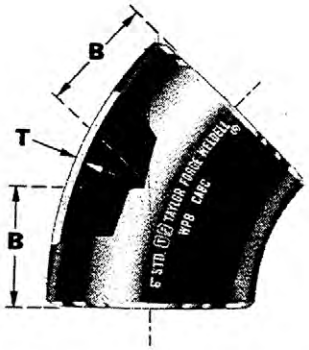
Contents *(continued)*

Standard Wall

WeldELLS—90° and 45°





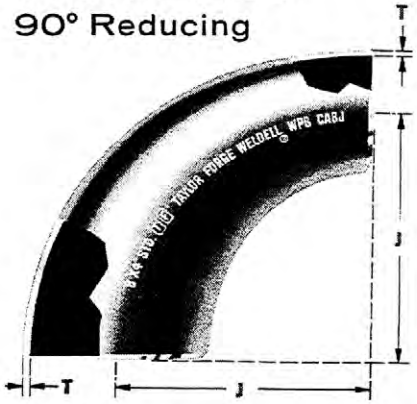


Nominal Pipe Size	90° WeldELLS				45° WeldELLS		DIMENSIONS COMMON TO FITTINGS AND PIPE		
	LONG RADIUS		SHORT RADIUS						
	Center to End A	Approx Weight Pounds	Center to End D	Approx Weight Pounds	Center to End B	Approx Weight Pounds	Outside Diameter	Inside Diameter	Wall Thickness
½	1½	.17	--	--	⅝	.09	.840	.622	.109
¾	1⅞	.17	--	--	⅞	.09	1.050	.824	.113
1	1½	.34	1	.23	⅞	.17	1.315	1.049	.133
1¼	1⅞	.58	1¼	.39	1	.29	1.660	1.380	.140
1½	2¼	.84	1½	.56	1⅛	.42	1.900	1.610	.145
2	3	1.50	2	1.00	1⅜	.75	2.375	2.067	.154
2½	3¾	2.98	2½	1.98	1¾	1.49	2.875	2.469	.203
3	4½	4.68	3	3.12	2	2.34	3.500	3.068	.216
3½	5¼	6.56	3½	4.38	2¼	3.28	4.000	3.548	.226
4	6	8.9	4	5.9	2½	4.45	4.500	4.026	.237
5	7½	15.1	5	10.1	3⅛	7.55	5.563	5.047	.258
6	9	23.5	6	15.6	3¾	11.80	6.625	6.065	.280
8	12	47	8	31.4	5	23.5	8.625	7.981	.322
10	15	83	10	55.7	6¼	41.8	10.750	10.020	.365
12	18	123	12	81.9	7½	61.5	12.750	12.000	.375
14	21	158	14	105	8¾	79	14.000	13.250	.375
16	24	207	16	138	10	104	16.000	15.250	.375
18	27	263	18	175	11¼	132	18.000	17.250	.375
20	30	323	20	215	12½	162	20.000	19.250	.375
22	33	392	--	--	13½	196	22.000	21.250	.375
24	36	468	24	313	15	234	24.000	23.250	.375
26	39	550	--	--	16	275	26.000	25.250	.375
30	45	733	30	488	18½	367	30.000	29.250	.375
36†	54	1061	36	707	22¼	531	36.000	35.250	.375
42†	63	1442	48	1079	26	721	42.000	41.250	.375

All dimensions are in inches.

WeldELLS

90° Reducing



All dimensions are in inches.

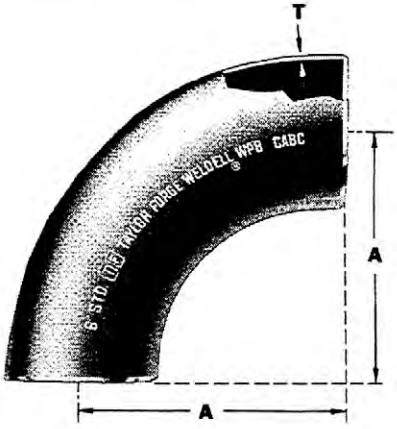
Nominal Pipe Size	Center to End J	Approx Weight Pounds
2 x 1½	3	1.50
2 x 1¼	3	1.37
2 x 1	3	1.25
2½ x 2	3¾	2.75
2½ x 1½	3¾	2.50
2½ x 1¼	3¾	2.25
3 x 2½	4½	4.25
3 x 2	4½	4.00
3 x 1½	4½	3.75
3½ x 3	5¼	6.00
3½ x 2½	5¼	5.50
3½ x 2	5¼	5.00
4 x 3½	6	8.50
4 x 3	6	8.00
4 x 2½	6	7.50
4 x 2	6	7.00

continued in next table

Nominal Pipe Size	Center to End J	Approx Weight Pounds
5 x 4	7½	14.0
5 x 3½	7½	13.0
5 x 3	7½	12.0
5 x 2½	7½	11.0
6 x 5	9	21.0
6 x 4	9	20.0
6 x 3½	9	19.0
6 x 3	9	17.5
8 x 6	12	40.0
8 x 5	12	37.5
8 x 4	12	35.0
10 x 8	15	76
10 x 6	15	67
10 x 5	15	62
12 x 10	18	110
12 x 8	18	102
12 x 6	18	90

WeldELLS

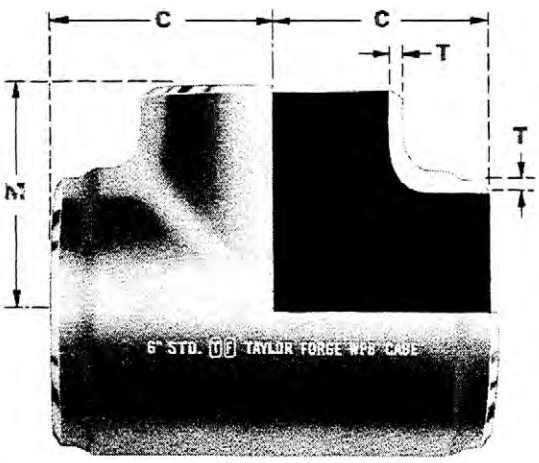
3R 90°

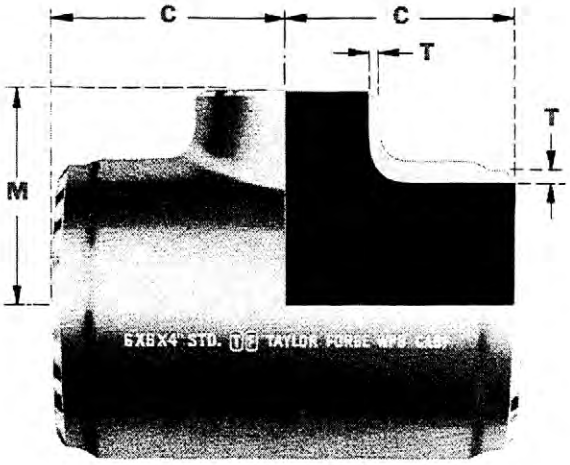


All dimensions are in inches.

Nominal Pipe Size	Nominal Wall Thickness T	Center to Short End A	Approx. Weight Pounds
2	.154	6	3.0
3	.216	9	9.2
4	.237	12	17.5
6	.280	18	48
8	.322	24	92
10	.365	30	164
12	.375	36	241
14	.375	42	309
16	.375	48	405

TEES—Straight and Reducing





Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
½	½	1	1	.35
	⅜	1	1	.25
	¼	1	1	.25
¾	¾	1⅛	1⅛	.45
	½	1⅛	1⅛	.50
	⅜	1⅛	1⅛	.50
1	1	1½	1½	.63
	¾	1½	1½	.58
	½	1½	1½	.57
	⅜	1½	1½	.56
1¼	1¼	1⅞	1⅞	1.16
	1	1⅞	1⅞	1.07
	¾	1⅞	1⅞	1.05
	½	1⅞	1⅞	1.03
1½	1½	2¼	2¼	1.70
	1¼	2¼	2¼	1.57
	1	2¼	2¼	1.55
	¾	2¼	2¼	1.52
	½	2¼	2¼	1.49

continued in next table

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
2	2	2½	2½	4.16
	1½	2½	2⅜	4.16
	1¼	2½	2¼	4.16
	1	2½	2	4.16
	¾	2½	1¾	4.16
2½	2½	3	3	5.91
	2	3	2¾	5.91
	1½	3	2⅝	6.78
	1¼	3	2½	6.78
	1	3	2¼	6.78
3	3	3⅜	3⅜	8.41
	2½	3⅜	3¼	8.41
	2	3⅜	3	8.41
	1½	3⅜	2⅞	8.41
	1¼	3⅜	2¾	8.41
	1	3⅜	2⅝	8.41
3½	3½	3¾	3¾	11.4
	3	3¾	3⅝	11.4
	2½	3¾	3½	11.4
	2	3¾	3¼	11.4
	1½	3¾	3⅛	11.4

continued in next table

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
4	4	4⅛	4⅛	13.2
	3½	4⅛	4	13.2
	3	4⅛	3⅞	13.2
	2½	4⅛	3¾	13.2
	2	4⅛	3½	13.2
	1½	4⅛	3⅜	13.2
5	5	4⅞	4⅞	21.9
	4	4⅞	4⅝	21.9
	3½	4⅞	4½	21.9
	3	4⅞	4⅜	21.9
	2½	4⅞	4¼	21.9
	2	4⅞	4⅛	21.9
6	6	5⅝	5⅝	36.3
	5	5⅝	5⅜	36.3
	4	5⅝	5⅛	32.9
	3½	5⅝	5	32.9
	3	5⅝	4⅞	32.9
	2½	5⅝	4¾	32.9
	2	5⅝	4⅝	32.9

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TEES—Straight and Reducing

continued from preceding page

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
8	8	7	7	61
	6	7	6⅝	61
	5	7	6⅜	61
	4	7	6⅛	61
	3½	7	6	61
	3	7	6	61
10	10	8½	8½	91
	8	8½	8	88
	6	8½	7⅝	88
	5	8½	7½	88
	4	8½	7¼	88
	3	8½	7	88
12	12	10	10	147
	10	10	9½	147
	8	10	9	143
	6	10	8⅝	143
	5	10	8½	143
	4	10	8¼	143
14	14	11	11	226
	12	11	10⅝	226
	10	11	10⅛	217
	8	11	9¾	217
	6	11	9⅜	217
16	16	12	12	242
	14	12	12	242
	12	12	11⅝	242
	10	12	11⅛	235
	8	12	10¾	235
	6	12	10⅜	235
18	18	13½	13½	333
	16	13½	13	333
	14	13½	13	333
	12	13½	12⅝	333
	10	13½	12⅛	319
	8	13½	11¾	319
20	20	15	15	504
	18	15	14½	504
	16	15	14	504
	14	15	14	493
	12	15	13⅝	493
	10	15	13⅛	482
	8	15	12¾	482

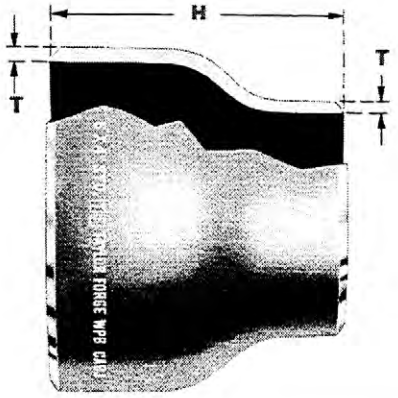
continued in next table

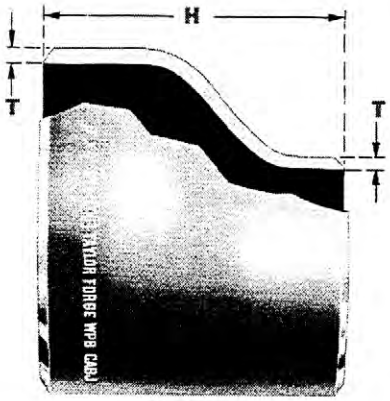
Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
22	22	16½	16½	555
	20	16½	16	555
	18	16½	15½	527
	16	16½	15	527
	14	16½	15	445
	12	16½	14⅝	445
	10	16½	14⅛	445
24†	24	17	17	765
	22	17	17	681
	20	17	17	601
	18	17	16½	601
	16	17	16	506
	14	17	16	506
	12	17	15⅝	506
	10	17	15⅛	424
26†	26	19½	19½	826
	24	19½	19	826
	22	19½	18½	727
	20	19½	18	727
	18	19½	17½	614
	16	19½	17	614
	14	19½	17	614
	12	19½	16⅝	614
30†	30	22	22	1130
	26	22	21½	1065
	24	22	21	1065
	22	22	20½	921
	20	22	20	921
	18	22	19½	921
	16	22	19	792
	14	22	19	792
36†	36	26½	26½	1617
	30	26½	25	1524
	26	26½	24½	1321
	24	26½	24	1321
	22	26½	23½	1321
	20	26½	23	1321
	18	26½	22½	1321
	16	26½	22	1136

Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE		
	Outside Diameter	Inside Diameter	Wall Thickness
¼	.540	.364	.088
⅜	.675	.493	.091
½	.840	.622	.109
¾	1.050	.824	.113
1	1.315	1.049	.133
1¼	1.660	1.380	.140
1½	1.900	1.610	.145
2	2.375	2.067	.154
2½	2.875	2.469	.203
3	3.500	3.068	.216
3½	4.000	3.548	.226
4	4.500	4.026	.237
5	5.563	5.047	.258
6	6.625	6.065	.280
8	8.625	7.981	.322
10	10.750	10.020	.365
12	12.750	12.000	.375
14	14.000	13.250	.375
16	16.000	15.250	.375
18	18.000	17.250	.375
20	20.000	19.250	.375
22	22.000	21.250	.375
24	24.000	23.250	.375
26	26.000	25.250	.375
30	30.000	29.250	.375
36	36.000	35.250	.375

All dimensions are in inches.

REDUCERS—Concentric and Eccentric



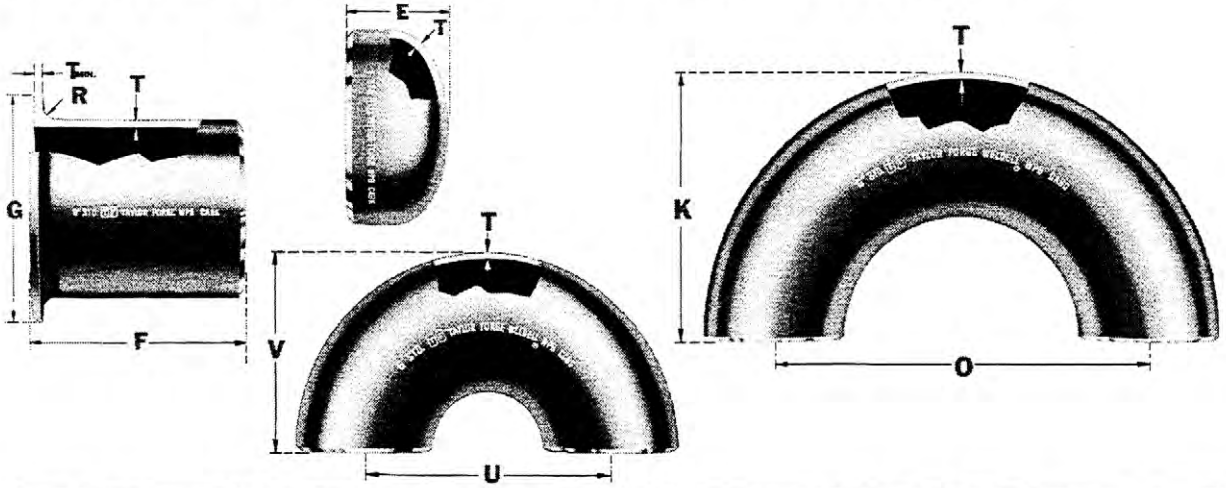


Nominal Pipe Size						Length	Approx Weight
Large End	Small End Sizes					H	Pounds
¾	½	⅜	- -	- -	- -	1½	.15
1	¾	½	⅜	- -	- -	2	.28
1¼	1	¾	½	- -	- -	2	.38
1½	1¼	1	¾	½	- -	2½	.57
2	1½	1¼	1	¾	- -	3	.90
2½	2	1½	1¼	1	- -	3½	1.70
3	2½	2	1½	1¼	1	3½	2.2
3½	3	2½	2	1½	1¼	4	3.0
4	3½	3	2½	2	1½	4	3.6
5	4	3½	3	2½	2	5	6.1
6	5	4	3½	3	2½	5½	8.7
8	6	5	4	3½	3	6	14.3
10	8	6	5	4	3	7	23.6
12	10	8	6	5	4	8	33.1
14	12	10	8	6	- -	13	59.2
16	14	12	10	8	- -	14	73
18	16	14	12	10	- -	15	88
20	18	16	14	12	- -	20	131
22	20	18	16	14	- -	20	144
24	22	20	18	16	- -	20	158
26	24	22	20	18	- -	24	205
30	26	24	22	20	- -	24	237
36	30	26	24	22	20	24	285
42	36	30	26	24	- -	24	334

All dimensions are in inches.

Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE		
	Outside Diameter	Inside Diameter	Wall Thick-ness
⅜	.675	.493	.091
½	.840	.622	.109
¾	1.050	.824	.113
1	1.315	1.049	.133
1¼	1.660	1.380	.140
1½	1.900	1.610	.145
2	2.375	2.067	.154
2½	2.875	2.469	.203
3	3.500	3.068	.216
3½	4.000	3.548	.226
4	4.500	4.026	.237
5	5.563	5.047	.258
6	6.625	6.065	.280
8	8.625	7.981	.322
10	10.750	10.020	.365
12	12.750	12.000	.375
14	14.000	13.250	.375
16	16.000	15.250	.375
18	18.000	17.250	.375
20	20.000	19.250	.375
22	22.000	21.250	.375
24	24.000	23.250	.375
26	26.000	25.250	.375
30	30.000	29.250	.375
36	36.000	35.250	.375
42	42.000	41.250	.375

STUB ENDS, CAPS, 180° RETURNS

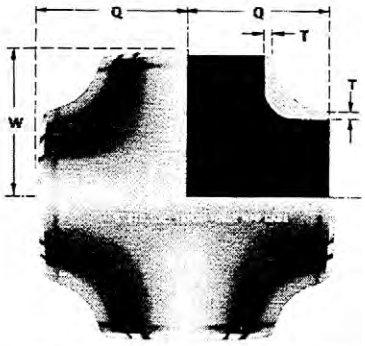


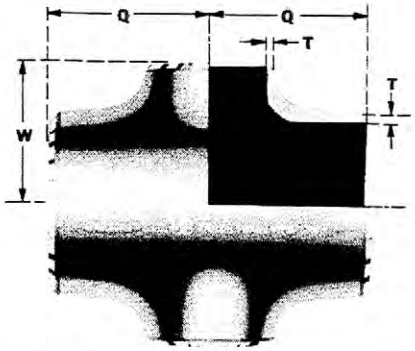
Nominal Pipe Size	Lap Joint Stub Ends				Caps	
	Length	Diameter of Lap	Radius	Approx Weight Pounds	Length	Approx Weight Pounds
	F	G	R		E	
½	3	1⅜	⅛	.30	1	.07
¾	3	1 11/16	⅛	.40	1½	.13
1	4	2	⅛	.66	1½	.22
1¼	4	2½	3/16	.91	1½	.31
1½	4	2⅞	¼	1.22	1½	.37
2	6	3⅝	5/16	2.19	1½	.51
2½	6	4⅛	5/16	3.45	1½	.81
3	6	5	⅜	4.71	2	1.42
3½	6	5½	⅜	5.54	2½	2.14
4	6	6 3/16	7/16	6.7	2½	2.54
5	8	7 5/16	7/16	11.7	3	4.19
6	8	8½	½	15.2	3½	6.44
8	8	10⅜	½	23	4	11.2
10	10	12¾	½	40	5	20.0
12	10	15	½	49	6	29.5
14	12	16¼	½	64	6½	35.4
16	12	18½	½	72	7	44.8
18	12	21	½	85	8	57.2
20	12	23	½	94	9	71
22	12	25¼	½	105	10	83
24	12	27¼	½	113	10½	102
26	--	--	--	--	10½	110
30	--	--	--	--	10½	137
36	--	--	--	--	10½	165

Nominal Pipe Size	180° Returns					
	LONG RADIUS			SHORT RADIUS		
	Center to Center	Back to Face	Approx Weight Pounds	Center to Center	Back to Face	Approx Weight Pounds
	O	K		U	V	
½	3	1⅞	.35	--	--	--
¾	2¼	1 11/16	.35	--	--	--
1	3	2 3/16	.69	2	1⅝	.46
1¼	3¾	2¾	1.17	2½	2 1/16	.78
1½	4½	3¼	1.68	3	2 7/16	1.12
2	6	4 3/16	3.00	4	3 3/16	2.00
2½	7½	5 3/16	5.96	5	3 15/16	3.96
3	9	6¼	9.36	6	4¾	6.24
3½	10½	7¼	13.10	7	5½	8.76
4	12	8¼	17.8	8	6¼	11.9
5	15	10 5/16	30.2	10	7¾	20.2
6	18	12 5/16	47.0	12	9 5/16	31.2
8	24	16 5/16	94	16	12 5/16	63
10	30	20⅜	167	20	15⅜	111
12	36	24⅜	246	24	18⅜	164
14	42	28	316	28	21	210
16	48	32	414	32	24	276
18	54	36	526	36	27	350
20	60	40	646	40	30	430
22	66	44	784	--	--	--
24	72	48	936	48	36	626
26	78	52	1100	--	--	--
30	90	60	1466	60	45	976
36	--	--	--	72	54	1387

All dimensions are in inches.

CROSSES—Straight and Reducing





Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	Q	W	
1¼	1¼	1⅞	1⅞	1.53
	1	1⅞	1⅞	1.25
	¾	1⅞	1⅞	1.14
1½	1½	2¼	2¼	2.33
	1¼	2¼	2¼	1.92
	1	2¼	2¼	1.75
	¾	2¼	2¼	1.64
2	2	2½	2½	3.36
	1½	2½	2⅜	2.91
	1¼	2½	2¼	2.68
	1	2½	2	2.52
2½	2½	3	3	5.87
	2	3	2¾	4.85
	1½	3	2⅝	4.68
	1¼	3	2½	4.47
	1	3	2¼	4.35
3	3	3⅜	3⅜	8.25
	2½	3⅜	3¼	7.28
	2	3⅜	3	6.71
	1½	3⅜	2⅞	6.58
	1¼	3⅜	2¾	6.38
	1	3⅜	2⅝	6.27
3½	3½	3¾	3¾	10.8
	3	3¾	3⅝	9.6
	2½	3¾	3½	9.2
	2	3¾	3¼	8.6
	1½	3¾	3⅛	8.6
4	4	4⅛	4⅛	13.9
	3½	4⅛	4	12.4
	3	4⅛	3⅞	11.9
	2½	4⅛	3¾	11.5
	2	4⅛	3½	11.1
	1½	4⅛	3⅜	11.0

continued in next table

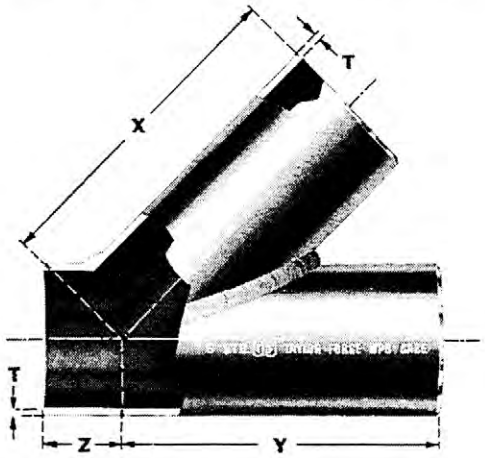
Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	Q	W	
5	5	4⅞	4⅞	21.6
	4	4⅞	4⅝	18.8
	3½	4⅞	4½	18.2
	3	4⅞	4⅜	17.9
	2½	4⅞	4¼	17.7
	2	4⅞	4⅛	17.2
6	6	5⅝	5⅝	31.5
	5	5⅝	5⅜	27.7
	4	5⅝	5⅛	26.6
	3½	5⅝	5	26.3
	3	5⅝	4⅞	26.0
	2½	5⅝	4¾	25.8
8	8	7	7	57.1
	6	7	6⅝	49.4
	5	7	6⅜	48.4
	4	7	6⅛	47.5
	3½	7	6	47.6
	3	7	6	47.4
10	10	8½	8½	96
	8	8½	8	84
	6	8½	7⅝	82
	5	8½	7½	81
	4	8½	7¼	81
12	12	10	10	139
	10	10	9½	123
	8	10	9	118
	6	10	8⅝	117
	5	10	8½	116
14	14	11	11	168
	12	11	10⅝	144
	10	11	10⅛	138
	8	11	9¾	136
	6	11	9⅜	134

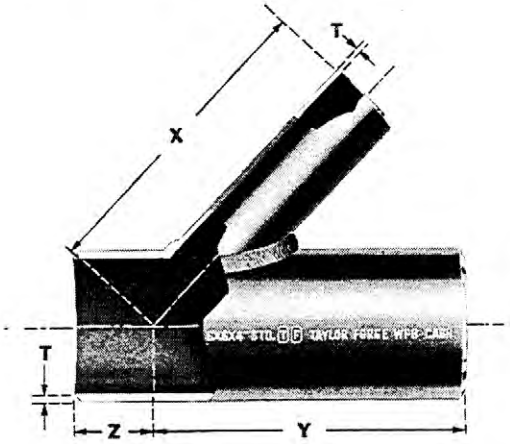
continued in next table

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	Q	W	
16	16	12	12	216
	14	12	12	188
	12	12	11⅝	182
	10	12	11⅛	176
	8	12	10¾	172
	6	12	10⅜	172
18	18	13½	13½	278
	16	13½	13	236
	14	13½	13	234
	12	13½	12⅝	228
	10	13½	12⅛	226
	8	13½	11¾	224
20	20	15	15	348
	18	15	14½	298
	16	15	14	290
	14	15	14	284
	12	15	13⅝	282
	10	15	13⅛	278
	8	15	12¾	276
24	24	17	17	488
	20	17	17	442
	18	17	16½	436
	16	17	16	432
	14	17	16	426
	12	17	15⅝	424
	10	17	15⅛	422

Bodies of crosses are thicker than ends to develop full pipe strength.

45° LATERALS—Straight and Reducing





Nominal Pipe Size	Dimensions		Approx. Weight Pounds
	X and Y	Z	
1	3.5	1.75	1.7
1¼	4.25	2.0	2.4
1½	5.0	2.5	3.3
2	6.0	3.25	5.0
2½	7.0	3.5	9.0
3	7.75	3.75	12.5
3½	8.375	4.0	17.2
4	8.5	4.5	20.5
5	11.0	4.75	31.0
6	12.5	5.25	42
8	15.25	6.25	76
10	18.0	7.0	124
12	21.5	8.0	180
14	25.0	10.0	218
16	28.5	12.0	275
18	32.0	13.0	326
20	35.0	14.0	396
24	41.25	16.25	544

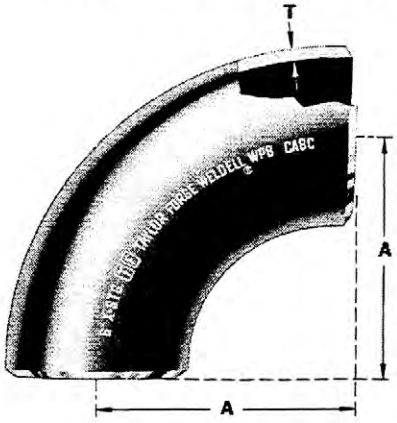
Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE		
	Outside Diameter	Inside Diameter	Wall Thickness
¾	1.050	.824	.113
1	1.315	1.049	.133
1¼	1.660	1.380	.140
1½	1.900	1.610	.145
2	2.375	2.067	.154
2½	2.875	2.469	.203
3	3.500	3.068	.216
3½	4.000	3.548	..226
4	4.500	4.026	.237
5	5.563	5.047	.258
6	6.625	6.065	.280
8	8.625	7.981	.322
10	10.750	10.020	.365
12	12.750	12.000	.375
14	14.000	13.250	.375
16	16.000	15.250	.375
18	18.000	17.250	.375
20	20.000	19.250	.375
24	24.000	23.250	.375

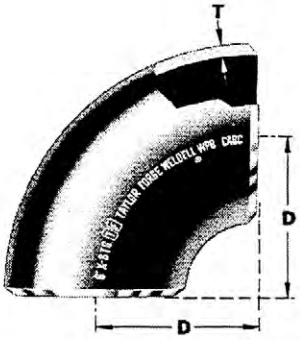
All dimensions are in inches.

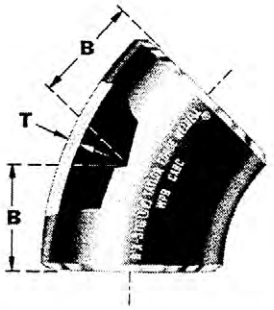
Laterals listed are fabricated from seamless Standard Wall Pipe. The pressure rating applicable to laterals is 40% of the allowable working pressure of the pipe from which the lateral is made. Where full allowable pipe pressure must be met, heavier laterals can be furnished with ends machined to match pipe dimensions.

Extra Heavy Wall

WeldELLS—90° and 45°







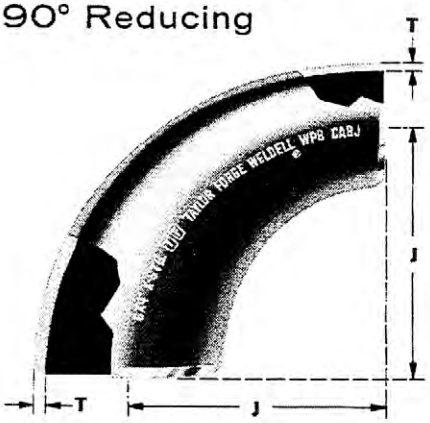
Nominal Pipe Size	90° WeldELLS LONG RADIUS Center to End A	90° WeldELLS LONG RADIUS Approx Weight Pounds	90° WeldELLS SHORT RADIUS Center to End D	90° WeldELLS SHORT RADIUS Approx Weight Pounds	45° WeldELLS Center to End B	45° WeldELLS Approx Weight Pounds
½	1½	.22	--	--	⅝	.11
¾	1⅛	.23	--	--	7/16	.11
1	1½	.45	--	--	⅞	.22
1¼	1⅞	.77	--	--	1	.39
1½	2¼	1.12	1½	.75	1⅛	.56
2	3	2.07	2	1.38	1⅜	1.04
2½	3¾	3.95	2½	2.64	1¾	1.98
3	4½	6.33	3	4.22	2	3.17
3½	5¼	9.04	3½	6.04	2¼	4.52
4	6	12.4	4	8.25	2½	6.20
5	7½	21.4	5	14.30	3⅛	10.70
6	9	35.3	6	23.50	3¾	17.70
8	12	71	8	47.7	5	35.8
10	15	112	10	75.2	6¼	56.0
12	18	162	12	108.0	7½	81.0
14	21	208	14	139	8¾	104
16	24	273	16	182	10	137
18	27	347	18	231	11¼	174
20	30	428	20	286	12½	214
22	33	520	--	--	13½	260
24	36	622	24	415	15	311
26	39	730	--	--	16	365
30	45	972	30	649	18½	486
36	54	1407	36	939	22¼	704
42	63	1916	48	1278	26	958

Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE Outside Diameter	Inside Diameter	Wall Thickness
½	.840	.546	.147
¾	1.050	.742	.154
1	1.315	.957	.179
1¼	1.660	1.278	.191
1½	1.900	1.500	.200
2	2.375	1.939	.218
2½	2.875	2.323	.276
3	3.500	2.900	.300
3½	4.000	3.364	.318
4	4.500	3.826	.337
5	5.563	4.813	.375
6	6.625	5.761	.432
8	8.625	7.625	.500
10	10.750	9.750	.500
12	12.750	11.750	.500
14	14.000	13.000	.500
16	16.000	15.000	.500
18	18.000	17.000	.500
20	20.000	19.000	.500
22	22.000	21.000	.500
24	24.000	23.000	.500
26	26.000	25.000	.500
30	30.000	29.000	.500
36	36.000	35.000	.500
42	42.000	41.000	.500

All dimensions are in inches.

WeldELLS

90° Reducing



All dimensions are in inches.

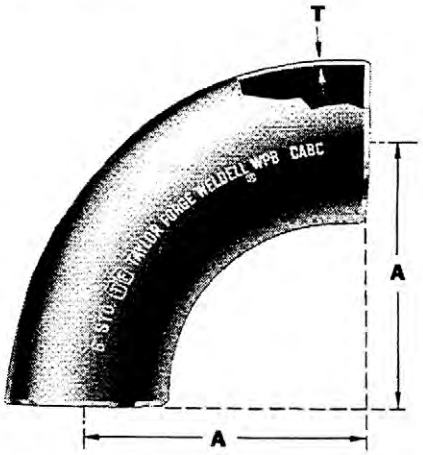
Nominal Pipe Size	Center to End J	Approx Weight Pounds
2 x 1½	3	2.00
2 x 1¼	3	1.75
2 x 1	3	1.50
2½ x 2	3¾	3.75
2½ x 1½	3¾	3.50
2½ x 1¼	3¾	3.25
3 x 2½	4½	6.00
3 x 2	4½	5.50
3 x 1½	4½	5.00
3½ x 3	5¼	8.25
3½ x 2½	5¼	7.75
3½ x 2	5¼	7.00
4 x 3½	6	11.50
4 x 3	6	10.75
4 x 2½	6	10.00
4 x 2	6	9.25

continued in next table

Nominal Pipe Size	Center to End J	Approx Weight Pounds
5 x 4	7½	19.5
5 x 3½	7½	18.0
5 x 3	7½	16.5
5 x 2½	7½	15.5
6 x 5	9	32
6 x 4	9	30
6 x 3½	9	28
6 x 3	9	26
8 x 6	12	61
8 x 5	12	57
8 x 4	12	53
10 x 8	15	98
10 x 6	15	88
10 x 5	15	83
12 x 10	18	150
12 x 8	18	128
12 x 6	18	117

WeldELLS

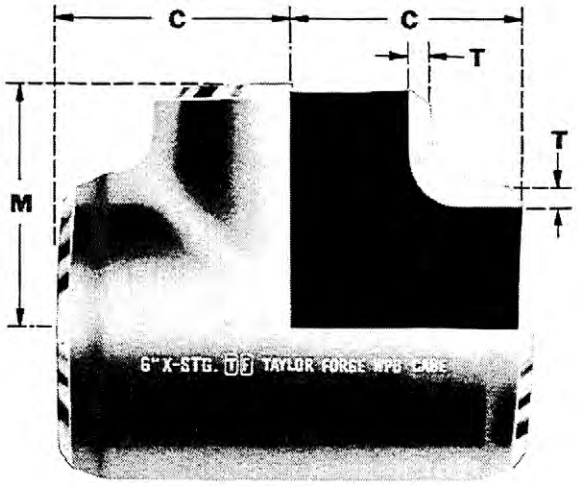
3R 90°

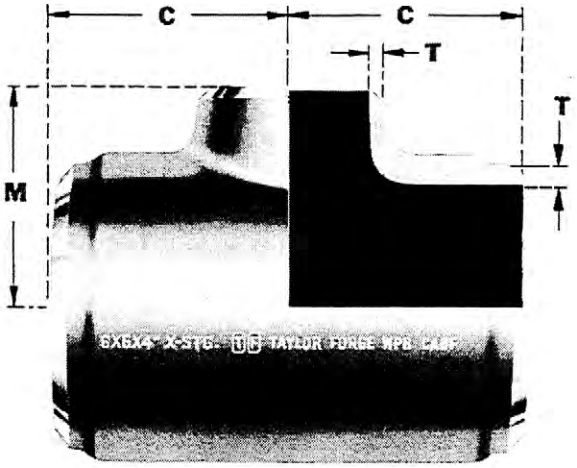


All dimensions are in inches.

Nominal Pipe Size	Nominal Wall Thickness T	Center to Short End A	Approx. Weight Pounds
2	.218	6	4.0
3	.300	9	12.4
4	.337	12	24.1
6	.432	18	64
8	.500	24	140
10	.500	30	221
12	.500	36	317
14	.500	42	407
16	.500	48	534

TEES—Straight and Reducing





Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
½	½	1	1	.45
	⅜	1	1	.28
	¼	1	1	.28
¾	¾	1⅛	1⅛	.60
	½	1⅛	1⅛	.50
	⅜	1⅛	1⅛	.50
1	1	1½	1½	.78
	¾	1½	1½	.73
	½	1½	1½	.71
	⅜	1½	1½	.69
1¼	1¼	1⅞	1⅞	1.44
	1	1⅞	1⅞	1.33
	¾	1⅞	1⅞	1.30
	½	1⅞	1⅞	1.27
1½	1½	2¼	2¼	2.12
	1¼	2¼	2¼	2.00
	1	2¼	2¼	1.93
	¾	2¼	2¼	1.89
	½	2¼	2¼	1.86

continued in next table

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
2	2	2½	2½	4.12
	1½	2½	2⅜	4.12
	1¼	2½	2¼	4.12
	1	2½	2	4.12
	¾	2½	1¾	4.12
2½	2½	3	3	6.78
	2	3	2¾	6.78
	1½	3	2⅝	6.78
	1¼	3	2½	6.78
	1	3	2¼	6.78
3	3	3⅜	3⅜	9.92
	2½	3⅜	3¼	9.92
	2	3⅜	3	9.92
	1½	3⅜	2⅞	9.92
	1¼	3⅜	2¾	9.92
	1	3⅜	2⅝	9.92
3½	3½	3¾	3¾	13.6
	3	3¾	3⅝	13.6
	2½	3¾	3½	13.6
	2	3¾	3¼	13.6
	1½	3¾	3⅛	13.6

continued in next table

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
4	4	4⅛	4⅛	18.6
	3½	4⅛	4	18.6
	3	4⅛	3⅞	18.6
	2½	4⅛	3¾	18.6
	2	4⅛	3½	18.5
	1½	4⅛	3⅜	18.5
5	5	4⅞	4⅞	28.5
	4	4⅞	4⅝	28.5
	3½	4⅞	4½	28.5
	3	4⅞	4⅜	28.5
	2½	4⅞	4¼	28.5
	2	4⅞	4⅛	28.5
6	6	5⅝	5⅝	42.5
	5	5⅝	5⅜	42.5
	4	5⅝	5⅛	42.5
	3½	5⅝	5	42.5
	3	5⅝	4⅞	42.5
	2½	5⅝	4¾	42.5
	2	5⅝	4⅝	42.5

continued on next page

TEES—Straight and Reducing *continued from preceding page*

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
8	8	7	7	76
	6	7	6⅝	76
	5	7	6⅜	76
	4	7	6⅛	76
	3½	7	6	76
	3	7	6	76
10	10	8½	8½	129
	8	8½	8	116
	6	8½	7⅝	116
	5	8½	7½	116
	4	8½	7¼	116
	3	8½	7	102
12	12	10	10	187
	10	10	9½	187
	8	10	9	180
	6	10	8⅝	180
	5	10	8½	180
	4	10	8¼	180
14	14	11	11	280
	12	11	10⅝	280
	10	11	10⅛	268
	8	11	9¾	268
	6	11	9⅜	268
16	16	12	12	369
	14	12	12	369
	12	12	11⅝	359
	10	12	11⅛	352
	8	12	10¾	352
	6	12	10⅜	352
18	18	13½	13½	425
	16	13½	13	425
	14	13½	13	425
	12	13½	12⅝	339
	10	13½	12⅛	322
	8	13½	11¾	322
20	20	15	15	583
	18	15	14½	504
	16	15	14	504
	14	15	14	493
	12	15	13⅜	493
	10	15	13⅛	482
	8	15	12¾	482

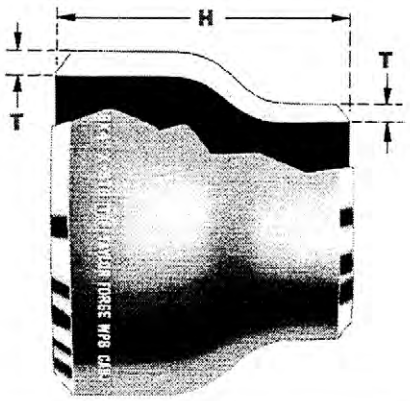
continued in next table

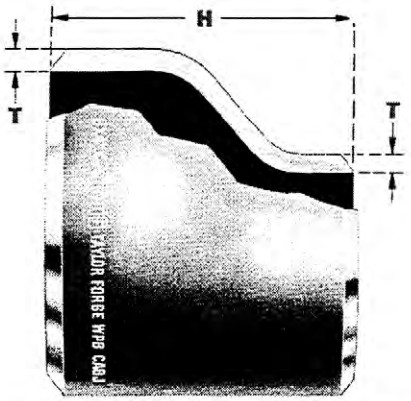
Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	C	M	
22	22	16½	16½	811
	20	16½	16	811
	18	16½	15½	670
	16	16½	15	670
	14	16½	15	517
	12	16½	14⅝	517
	10	16½	14⅛	517
24	24	17	17	934
	22	17	17	849
	20	17	17	683
	18	17	16½	683
	16	17	16	509
	14	17	16	509
	12	17	15⅝	509
	10	17	15⅛	509
26	26	19½	19½	1121
	24	19½	19	1121
	22	19½	18½	925
	20	19½	18	925
	18	19½	17½	713
	16	19½	17	713
	14	19½	17	713
	12	19½	16⅝	713
30	30	22	22	1510
	26	22	21½	1257
	24	22	21	1257
	22	22	20½	1048
	20	22	20	1048
	18	22	19½	1048
	16	22	19	921
	14	22	19	921
36	36	26½	26½	2165
	30	26½	25	1893
	26	26½	24½	1504
	24	26½	24	1504
	22	26½	23½	1504
	20	26½	23	1504
	18	26½	22½	1321
	16	26½	22	1321

Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE		
	Outside Diameter	Inside Diameter	Wall Thickness
¼	.540	.302	.119
⅜	.675	.423	.126
½	.840	.546	.147
¾	1.050	.742	.154
1	1.315	.957	.179
1¼	1.660	1.278	.191
1½	1.900	1.500	.200
2	2.375	1.939	.218
2½	2.875	2.323	.276
3	3.500	2.900	.300
3½	4.000	3.364	.318
4	4.500	3.826	.337
5	5.563	4.813	.375
6	6.625	5.761	.432
8	8.625	7.625	.500
10	10.750	9.750	.500
12	12.750	11.750	.500
14	14.000	13.000	.500
16	16.000	15.000	.500
18	18.000	17.000	.500
20	20.000	19.000	.500
22	22.000	21.000	.500
24	24.000	23.000	.500
26	26.000	25.000	.500
30	30.000	29.000	.500
36	36.000	35.000	.500

All dimensions are in inches.

REDUCERS—Concentric and Eccentric



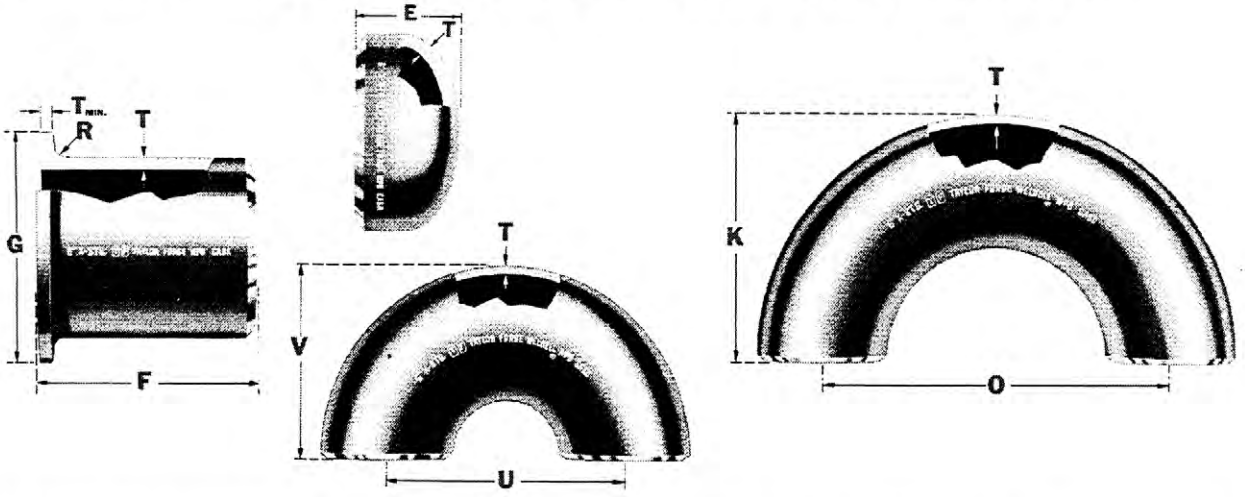


Nominal Pipe Size						Length	Approx Weight
Large End	Small End Sizes					H	Pounds
¾	½	⅜	- -	- -	- -	1½	.22
1	¾	½	⅜	- -	- -	2	.36
1¼	1	¾	½	- -	- -	2	.50
1½	1¼	1	¾	½	- -	2½	.76
2	1½	1¼	1	¾	- -	3	1.25
2½	2	1½	1¼	1	- -	3½	2.23
3	2½	2	1½	1¼	1	3½	2.99
3½	3	2½	2	1½	1¼	4	4.16
4	3½	3	2½	2	1½	4	5.00
5	4	3½	3	2½	2	5	8.65
6	5	4	3½	3	2½	5½	13.10
8	6	5	4	3½	3	6	21.72
10	8	6	5	4	3	7	31.9
12	10	8	6	5	4	8	43.6
14	12	10	8	6	- -	13	78.3
16	14	12	10	8	- -	14	97
18	16	14	12	10	- -	15	117
20	18	16	14	12	- -	20	174
22	20	18	16	14	- -	20	191
24	22	20	18	16	- -	20	210
26	24	22	20	18	- -	24	272
30	26	24	22	20	- -	24	315
36	30	26	24	22	- -	24	379
42	36	30	26	24	- -	24	443

All dimensions are in inches.

Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE		
	Outside Diameter	Inside Diameter	Wall Thick-ness
⅜	.675	.423	.126
½	.840	.546	.147
¾	1.050	.742	.154
1	1.315	.957	.179
1¼	1.660	1.278	.191
1½	1.900	1.500	.200
2	2.375	1.939	.218
2½	2.875	2.323	.276
3	3.500	2.900	.300
3½	4.000	3.364	.318
4	4.500	3.826	.337
5	5.563	4.813	.375
6	6.625	5.761	.432
8	8.625	7.625	.500
10	10.750	9.750	.500
12	12.750	11.750	.500
14	14.000	13.000	.500
16	16.000	15.000	.500
18	18.000	17.000	.500
20	20.000	19.000	.500
22	22.000	21.000	.500
24	24.000	23.000	.500
26	26.000	25.000	.500
30	30.000	29.000	.500
36	36.000	35.000	.500
42	42.000	41.000	.500

STUB ENDS, CAPS, 180° RETURNS

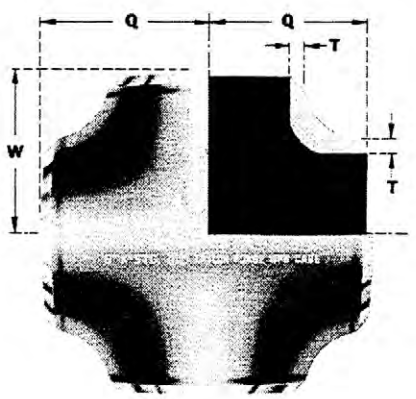


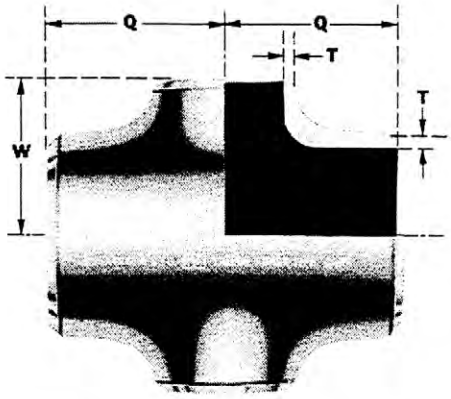
Nominal Pipe Size	Lap Joint Stub Ends				Caps	
	Length	Diameter of Lap	Radius	Approx Weight Pounds	Length	Approx Weight Pounds
	F	G	R		E	
½	3	1⅜	⅛	.32	1	.10
¾	3	1 11/16	⅛	.44	1½	.19
1	4	2	⅛	.85	1½	.28
1¼	4	2½	3/16	1.21	1½	.40
1½	4	2⅞	¼	1.49	1½	.49
2	6	3⅝	5/16	3.01	1½	.69
2½	6	4⅛	5/16	4.59	1½	1.03
3	6	5	⅜	6.27	2	1.88
3½	6	5½	⅜	6.58	2½	2.88
4	6	6 3/16	7/16	9.33	2½	3.47
5	8	7 5/16	7/16	16.60	3	5.84
6	8	8½	½	23.00	3½	9.45
8	8	10⅝	½	35.0	4	16.7
10	10	12¾	½	53.6	5	26.5
12	10	15	½	65.8	6	38.0
14	12	16¼	½	89	6½	45.3
16	12	18½	½	96	7	57.8
18	12	21	½	112	8	74.0
20	12	23	½	125	9	94
22	12	25¼	½	139	10	110
24	12	27¼	½	151	10½	131
26	--	--	--	--	10½	146
30	--	--	--	--	10½	186
36	--	--	--	--	10½	260

Nominal Pipe Size	180° Returns					
	LONG RADIUS			SHORT RADIUS		
	Center to Center	Back to Face	Approx Weight Pounds	Center to Center	Back to Face	Approx Weight Pounds
	O	K		U	V	
½	3	1⅞	.45	--	--	--
¾	2¼	1 11/16	.46	--	--	--
1	3	2 3/16	.89	--	--	--
1¼	3¾	2¾	1.54	--	--	--
1½	4½	3¼	2.24	3	2 7/16	1.50
2	6	4 3/16	4.14	4	3 3/16	2.76
2½	7½	5 3/16	7.90	5	3 15/16	5.28
3	9	6¼	12.70	6	4¾	8.44
3½	10½	7¼	18.10	7	5½	12.10
4	12	8¼	24.8	8	6¼	16.5
5	15	10 5/16	42.8	10	7¾	28.6
6	18	12 5/16	70.6	12	9 5/16	47.0
8	24	16 5/16	143	16	12 5/16	95
10	30	20⅜	224	20	15⅜	150
12	36	24⅜	324	24	18⅜	216
14	42	28	416	28	21	278
16	48	32	546	32	24	364
18	54	36	694	36	27	462
20	60	40	856	40	30	572
22	66	44	1040	--	--	--
24	72	48	1244	48	36	830
26	78	52	1460	--	--	--
30	90	60	1944	60	45	1298
36	--	--	--	72	54	1838

All dimensions are in inches.

CROSSES—Straight and Reducing





Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	Q	W	
1¼	1¼	1⅞	1⅞	1.86
	1	1⅞	1⅞	1.53
	¾	1⅞	1⅞	1.38
1½	1½	2¼	2¼	2.84
	1¼	2¼	2¼	2.36
	1	2¼	2¼	2.16
	¾	2¼	2¼	2.03
2	2	2½	2½	4.18
	1½	2½	2⅜	3.65
	1¼	2½	2¼	3.37
	1	2½	2	3.20
2½	2½	3	3	7.16
	2	3	2¾	5.99
	1½	3	2⅝	5.80
	1¼	3	2½	5.57
	1	3	2¼	5.41
3	3	3⅜	3⅜	10.30
	2½	3⅜	3¼	8.91
	2	3⅜	3	8.50
	1½	3⅜	2⅞	8.37
	1¼	3⅜	2¾	8.14
	1	3⅜	2⅝	8.02
3½	3½	3¾	3¾	13.8
	3	3¾	3⅝	12.2
	2½	3¾	3½	11.8
	2	3¾	3¼	11.2
	1½	3¾	3⅛	11.1
4	4	4⅛	4⅛	17.8
	3½	4⅛	4	15.9
	3	4⅛	3⅞	15.4
	2½	4⅛	3¾	15.0
	2	4⅛	3½	14.4
	1½	4⅛	3⅜	14.4

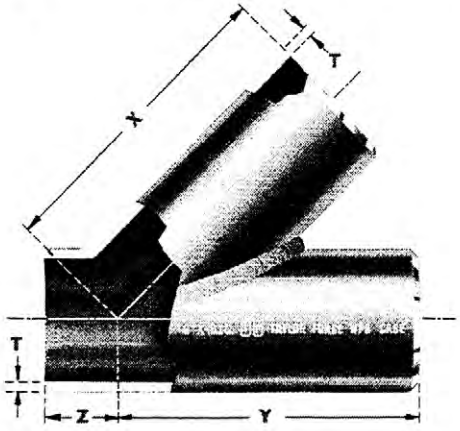
continued in next table

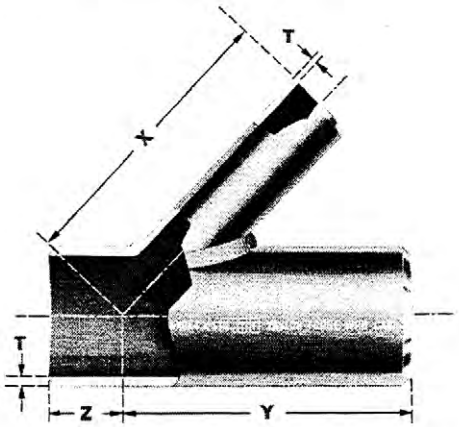
Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	Q	W	
5	5	4⅞	4⅞	28.2
	4	4⅞	4⅝	24.8
	3½	4⅞	4½	24.2
	3	4⅞	4⅜	23.8
	2½	4⅞	4¼	23.6
	2	4⅞	4⅛	23.1
6	6	5⅝	5⅝	43.4
	5	5⅝	5⅜	38.2
	4	5⅝	5⅛	37.1
	3½	5⅝	5	36.8
	3	5⅝	4⅞	36.5
	2½	5⅝	4¾	36.4
8	8	7	7	80
	6	7	6⅝	70
	5	7	6⅜	69
	4	7	6⅛	68
	3½	7	6	68
	3	7	6	68
10	10	8½	8½	123
	8	8½	8	110
	6	8½	7⅝	106
	5	8½	7½	105
	4	8½	7¼	105
12	12	10	10	174
	10	10	9½	155
	8	10	9	153
	6	10	8⅝	150
	5	10	8½	149
14	14	11	11	214
	12	11	10⅝	186
	10	11	10⅛	178
	8	11	9¾	176
	6	11	9⅜	174

continued in next table

Nominal Pipe Size		Center to End of Run	Center to End of Branch	Approx Weight Pounds
Run	Branch	Q	W	
16	16	12	12	274
	14	12	12	240
	12	12	11⅝	234
	10	12	11⅛	230
	8	12	10¾	226
	6	12	10⅜	226
18	18	13½	13½	352
	16	13½	13	300
	14	13½	13	300
	12	13½	12⅝	296
	10	13½	12⅛	292
	8	13½	11¾	290
20	20	15	15	438
	18	15	14½	380
	16	15	14	370
	14	15	14	364
	12	15	13⅝	362
	10	15	13⅛	360
	8	15	12¾	358
24	24	17	17	610
	20	17	17	562
	18	17	16½	558
	16	17	16	554
	14	17	16	546
	12	17	15⅝	546
	10	17	15⅛	544

45° LATERALS—Straight and Reducing





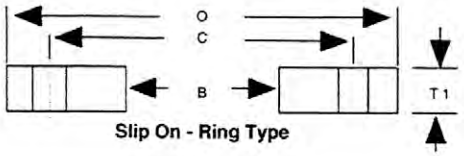
Nominal Pipe Size	Dimensions		Approx. Weight Pounds
	X and Y	Z	
1	3.5	1.75	2.5
1¼	4.25	2.0	3.8
1½	5.0	2.5	5.5
2	6.0	3.25	7.7
2½	7.0	3.5	13
3	7.75	3.75	18
3½	8.375	4.0	25
4	8.5	4.5	32
5	11.0	4.75	49
6	12.5	5.25	78
8	15.25	6.25	140
10	18.0	7.0	200
12	21.5	8.0	273
14	25.0	10.0	340
16	28.5	12.0	431
18	32.0	13.0	525
20	35.0	14.0	625
24	41.25	16.25	875

Nominal Pipe Size	DIMENSIONS COMMON TO FITTINGS AND PIPE		
	Outside Diameter	Inside Diameter	Wall Thickness
¾	1.050	.742	.154
1	1.315	.957	.179
1¼	1.660	1.278	.191
1½	1.900	1.500	.200
2	2.375	1.939	.218
2½	2.875	2.323	.276
3	3.500	2.900	.300
3½	4.000	3.364	.318
4	4.500	3.826	.337
5	5.563	4.813	.375
6	6.625	5.761	.432
8	8.625	7.625	.500
10	10.750	9.750	.500
12	12.750	11.750	.500
14	14.000	13.000	.500
16	16.000	15.000	.500
18	18.000	17.000	.500
20	20.000	19.000	.500
24	24.000	23.000	.500

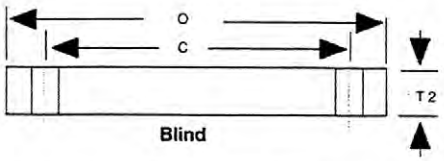
All dimensions are in inches.

Flanges

AWWA C 207-94 Class D
Steel Ring



Slip On - Ring Type



Blind

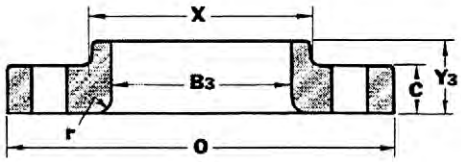
Nom Pipe Size	Outside Dia O	Bore B	Thickness Slip-On T1	Thickness Blind T2	Drilling Template No. Bolt Holes	Drilling Template Dia Holes	Drilling Template Bolt Circle C	Approx. Wt. (Lbs.) Slip-On	Approx. Wt. (Lbs.) Blind
4	9.00	4.57	0.625	0.625	8	0.750	7.50	7.9	11.0
5	10.00	5.66	0.625		8	0.875	8.50	10.1	
6	11.00	6.72	0.688	0.692	8	0.875	9.50	11.2	18.4
8	13.50	8.72	0.688	0.805	8	0.875	11.75	15.9	33.0
10	16.00	10.88	0.688	0.947	12	1.000	14.25	20.2	54.0
12	19.00	12.88	0.812	1.110	12	1.000	17.00	34.8	89.7
14	21.00	14.19	0.938	1.127	12	1.125	18.75	49.5	112.6
16	23.50	16.19	1.000	1.258	16	1.125	21.25	63.6	157.0
18	25.00	18.19	1.063	1.326	16	1.250	22.75	68.1	187.4
20	27.50	20.19	1.125	1.442	20	1.250	25.00	85.1	246.4
22	29.50	22.19	1.188		20	1.375	27.25	97.2	
24	32.00	24.25	1.250	1.657	20	1.375	29.50	120.1	385.8
30	38.75	30.25	1.375	2.003	28	1.375	36.00	177.2	684.7
36	46.00	36.25	1.625	2.369	32	1.625	42.75	286.4	1142.5
42	53.00	42.25	1.750	2.725	36	1.625	49.50	396.8	1751.3
48	59.50	48.25	1.875	3.067	44	1.625	56.00	468.8	2485.8
54	66.25	54.25	2.125	3.431	44	1.875	62.75	680.2	3452.5
60	73.00	60.25	2.250	3.774	52	1.875	69.25	845.7	4613.2
66	80.00	66.25	2.500	4.132	52	1.875	76.00	1122.4	6084.9
72	86.50	72.25	2.625	4.476	60	1.875	82.50	1323.8	7707.6
78	93.00	78.25	2.750		64	2.125	89.00	1541.7	
84	99.75	84.25	2.875		64	2.125	95.50	1751.7	
90	106.50	90.25	3.000		68	2.375	102.00	2135.5	
96	113.25	96.25	3.250		68	2.375	108.50	2391.4	
102	120.00	102.25	3.250		72	2.625	114.50	2861.5	
108	126.75	108.25	3.375		72	2.625	120.75	3167.8	
114	133.50	114.25	3.500		76	2.875	126.75	3714.0	
120	140.25	120.25	3.500		76	2.875	132.75	4093.8	
126	147.00	126.25	3.750		80	3.125	139.25	4730.9	
132	153.75	132.25	3.875		80	3.125	145.75	5182.7	
138	160.50	138.25	4.000		84	3.375	152.00	5916.0	
144	167.25	144.25	4.125		84	3.375	158.25	6447.3	

1) Furnished Flat Face Unless Otherwise Specified.
2) Other Bores and Facings Available Upon Request.
3) All Dimensions in inches.
4) Bores above 24" Are Not Specified by AWWA. Bores Shown are Commonly Used.
5) BLIND FLANGES: Above 48", designers should consider using dished heads welded to a standard flange.

Class D Flanges:
Service Rating at Atmospheric 4" to 12" - 175 psi
Temperature: 14" & larger - 150 psi

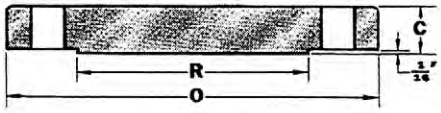
Drilling Template: To match ANSI B16.5 150# Standard.
AWWA WATER SERVICE RATING OF 150 psi

SOCKET WELDING TYPE



LAP JOINT

REDUCING FLANGES



BLIND

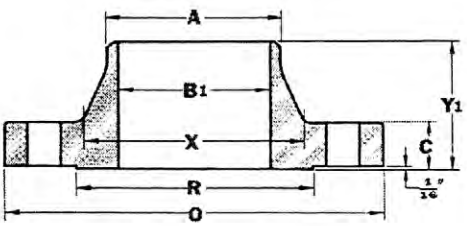
Drilling Template and Bolting

Nominal Pipe Size	DRILLING			BOLTING			
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	Machine Bolt Length	Stud Bolt Length +	
					Raised Face	Raised Face	Ring Joint
½	2⅜	4	⅝	½	1¾	2¼	--
¾	2¾	4	⅝	½	2	2¼	--
1	3⅛	4	⅝	½	2	2½	3
1¼	3½	4	⅝	½	2¼	2½	3
1½	3⅞	4	⅝	½	2¼	2¾	3¼
2	4¾	4	¾	⅝	2¾	3	3½
2½	5½	4	¾	⅝	3	3¼	3¾
3	6	4	¾	⅝	3	3½	4
3½	7	8	¾	⅝	3	3½	4
4	7½	8	¾	⅝	3	3½	4
5	8½	8	⅞	¾	3¼	3¾	4¼
6	9½	8	⅞	¾	3¼	3¾	4¼
8	11¾	8	⅞	¾	3½	4	4½
10	14¼	12	1	⅞	3¾	4½	5
12	17	12	1	⅞	4	4½	5
14	18¾	12	1⅛	1	4¼	5	5½
16	21¼	16	1⅛	1	4½	5¼	5¾
18	22¾	16	1¼	1⅛	4¾	5¾	6¼
20	25	20	1¼	1⅛	5¼	6	6½
22†	27¼	20	1⅜	1¼	5½	6½	7
24	29½	20	1⅜	1¼	5¾	6¾	7¼
26	31¾	24	1⅜	1¼	6	7	--
28	34	28	1⅜	1¼	6	7	--
30	36	28	1⅜	1¼	6¼	7¼	--
32	38½	28	1⅝	1½	6¾	8	--
34	40½	32	1⅝	1½	7	8	--
36	42¾	32	1⅝	1½	7	8¼	--
42	49½	36	1⅝	1½	7½	8¾	--

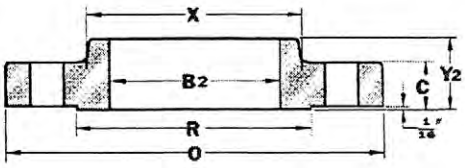
Weights

Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	2	1	1	1
¾	2	2	2	2
1	3	2	2	2
1¼	3	3	3	3
1½	4	3	3	4
2	6	5	5	5
2½	8	7	7	7
3	10	8	8	9
3½	12	11	11	13
4	15	13	13	17
5	19	15	15	20
6	24	19	19	26
8	39	30	30	45
10	52	43	43	70
12	80	64	64	110
14	110	90	105	140
16	140	98	140	180
18	150	130	160	220
20	180	165	195	285
22	225	185	245	355
24	260	220	275	430
26	300	250	--	525
28	315	285	--	620
30	360	315	--	720
32	435	395	--	870
34	465	420	--	990
36	520	480	--	1125
42	750	680	--	1625

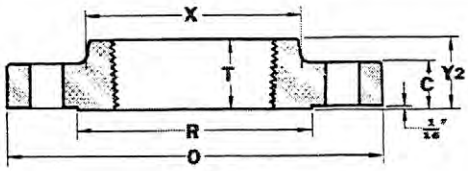
All dimensions are in inches.



WELDING NECK



SLIP-ON



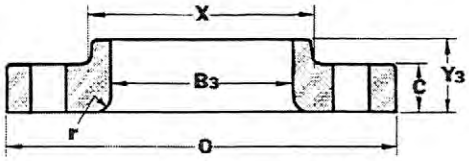
THREADED

Nominal Pipe Size	COMMON DIMENSIONS				BORE			LENGTH THRU HUB			Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.
	Outside Diam.	Thickness Min.△	O. D. Raised Face	Diam. at Base of Hub	Welding Neck	Slip-on	Lap Joint	Welding Neck△	Slip-on and Thr'd△	Lap Joint			
	O	C	R	X	B1	B2	B3	Y1	Y2	Y3	A	r	T
½	3½	7/16	1⅜	1 3/16	.62	.88	.90	1⅞	⅝	⅝	.84	⅛	⅝
¾	3⅞	½	1 11/16	1½	.82	1.09	1.11	2 1/16	⅝	⅝	1.05	⅛	⅝
1	4¼	9/16	2	1 15/16	1.05	1.36	1.38	2 3/16	1 1/16	1 1/16	1.32	⅛	1 1/16
1¼	4⅝	⅝	2½	2 5/16	1.38	1.70	1.72	2¼	1 3/16	1 3/16	1.66	3/16	1 3/16
1½	5	1 1/16	2⅞	2 9/16	1.61	1.95	1.97	2 7/16	⅞	⅞	1.90	¼	⅞
2	6	¾	3⅝	3 1/16	2.07	2.44	2.46	2½	1	1	2.38	5/16	1
2½	7	⅞	4⅛	3 5/16	2.47	2.94	2.97	2¾	1⅛	1⅛	2.88	5/16	1⅛
3	7½	15/16	5	4¼	3.07	3.57	3.60	2¾	1 3/16	1 3/16	3.50	⅜	1 3/16
3½	8½	15/16	5½	4 13/16	3.55	4.07	4.10	2 13/16	1¼	1¼	4.00	⅜	1¼
4	9	15/16	6 3/16	5 5/16	4.03	4.57	4.60	3	1 5/16	1 5/16	4.50	7/16	1 5/16
5	10	15/16	7 5/16	6 7/16	5.05	5.66	5.69	3½	1 7/16	1 7/16	5.56	7/16	1 7/16
6	11	1	8½	7 9/16	6.07	6.72	6.75	3½	1 9/16	1 9/16	6.63	½	1 9/16
8	13½	1⅛	10⅝	9 11/16	7.98	8.72	8.75	4	1¾	1¾	8.63	½	1¾
10	16	1 3/16	12¾	12	10.02	10.88	10.92	4	1 15/16	1 15/16	10.75	½	1 15/16
12	19	1¼	15	14⅜	12.00	12.88	12.92	4½	2 3/16	2 3/16	12.75	½	2 3/16
14	21	1⅜	16¼	15¾	13.25	14.14	14.18	5	2¼	3⅛	14.00	½	2¼
16	23½	1 7/16	18½	18	15.25	16.16	16.19	5	2½	3 7/16	16.00	½	2½
18	25	1 9/16	21	19⅞	17.25	18.18	18.20	5½	2 11/16	3 13/16	18.00	½	2 11/16
20	27½	1 11/16	23	22	19.25	20.20	20.25	5 11/16	2⅞	4 1/16	20.00	½	2⅞
22	29½	1 13/16	25¼	24¼	21.25	22.22	22.25	5⅞	3⅛	4¼	22.00	½	3⅛
24	32	1⅞	27¼	26⅛	23.25	24.25	24.25	6	3¼	4⅜	24.00	½	3¼
26	34¼	2	29¼	28½	As specified by purchaser	26.25	- -	5	3⅜	- -	26.00	- -	- -
28	36½	2 1/16	31¼	30¾		28.25	- -	5 1/16	3 7/16	- -	28.00	- -	- -
30	38¾	2⅛	33¾	32¾		30.25	- -	5⅛	3½	- -	30.00	- -	- -
32	41¾	2¼	35¾	35		32.25	- -	5¼	3⅝	- -	32.00	- -	- -
34	43¾	2 5/16	37¾	37		34.25	- -	5 5/16	3 11/16	- -	34.00	- -	- -
36	46	2⅜	40¼	39¼		36.25	- -	5⅜	3¾	- -	36.00	- -	- -
42	53	2⅝	47	46		42.25	- -	5⅝	4	- -	42.00	- -	- -

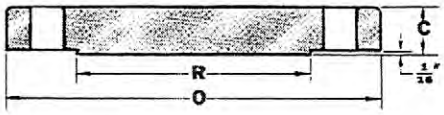
△ The 1/16" raised face is included in Thickness C and Length Y.

SOCKET WELDING TYPE

REDUCING FLANGES



LAP JOINT



BLIND

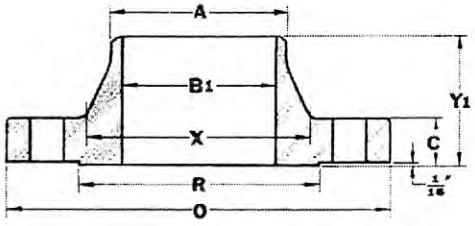
Drilling Template and Bolting

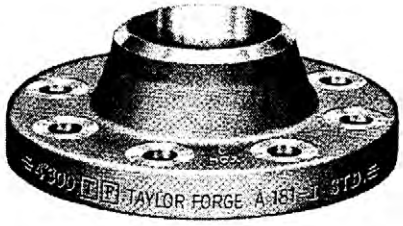
Nominal Pipe Size	DRILLING			BOLTING			
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	Machine Bolt Length	Stud Bolt Length +	
					Raised Face	Raised Face	Ring Joint
½	2⅝	4	⅝	½	2	2½	3
¾	3¼	4	¾	⅝	2½	2¾	3¼
1	3½	4	¾	⅝	2½	3	3½
1¼	3⅞	4	¾	⅝	2¾	3	3½
1½	4½	4	⅞	¾	3	3½	4
2	5	8	¾	⅝	3	3¼	4
2½	5⅞	8	⅞	¾	3¼	3¾	4½
3	6⅝	8	⅞	¾	3½	4	4¾
3½	7¼	8	⅞	¾	3¾	4¼	5
4	7⅞	8	⅞	¾	3¾	4¼	5
5	9¼	8	⅞	¾	4	4½	5¼
6	10⅝	12	⅞	¾	4¼	4¾	5½
8	13	12	1	⅞	4¾	5¼	6
10	15¼	16	1⅛	1	5¼	6	6¾
12	17¾	16	1¼	1⅛	5¾	6½	7¼
14	20¼	20	1¼	1⅛	6	6¾	7½
16	22½	20	1⅜	1¼	6½	7¼	8
18	24¾	24	1⅜	1¼	6¾	7½	8¼
20	27	24	1⅜	1¼	7	8	8¾
22†	29¼	24	1⅝	1½	7½	8¾	9¾
24	32	24	1⅝	1½	7¾	9	10
26	34½	28	1¾	1⅝	8¾	10	11
28	37	28	1¾	1⅝	9¼	10½	11½
30	39¼	28	1⅞	1¾	10	11¼	12¼
32	41½	28	2	1⅞	10½	12	13¼
34	43½	28	2	1⅞	10¾	12¼	13½
36	46	32	2⅛	2	11¼	12¾	14

Weights

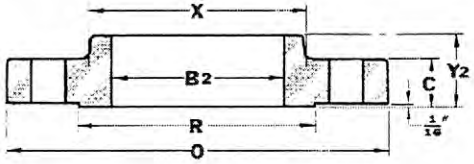
Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	2	2	2	2
¾	3	3	3	3
1	4	3	3	3
1¼	5	4	4	4
1½	7	6	6	6
2	9	7	7	8
2½	12	10	10	12
3	15	13	13	16
3½	18	17	17	21
4	25	22	22	27
5	32	28	28	35
6	42	39	39	50
8	67	58	58	81
10	91	81	91	125
12	140	115	140	185
14	180	165	190	250
16	250	190	250	295
18	320	250	295	395
20	400	315	370	505
22	465	370	435	640
24	580	475	550	790
26	670	570	- -	1050
28	810	720	- -	1275
30	930	810	- -	1500
32	1025	890	- -	1775
34	1200	1075	- -	2025
36	1300	1200	- -	2275

All dimensions are in inches.

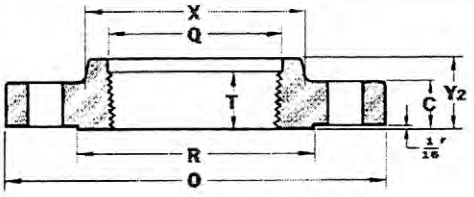




WELDING NECK



SLIP-ON



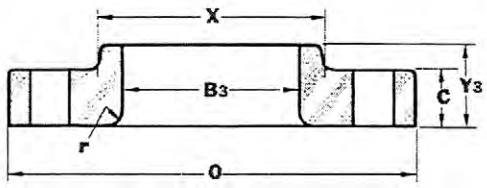
THREADED

Nominal Pipe Size	COMMON DIMENSIONS				BORE				LENGTH THRU HUB			Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.
	Outside Diam.	Thickness Min.△	O.D. of Raised Face	Diam. at Base of Hub	Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck△	Slip-on and Thr'd△	Lap Joint			
	O	C	R	X	B1	B2	B3	Q	Y1	Y2	Y3	A	r	T
½	3¾	9/16	1⅜	1½	.62	.88	.90	.93	2 1/16	⅞	⅞	.84	⅛	⅝
¾	4⅝	⅝	1 11/16	1⅞	.82	1.09	1.11	1.14	2¼	1	1	1.05	⅛	⅝
1	4⅞	1 1/16	2	2⅛	1.05	1.36	1.38	1.41	2 7/16	1 1/16	1 1/16	1.32	⅛	1 1/16
1¼	5¼	¾	2½	2½	1.38	1.70	1.72	1.75	2 9/16	1 1/16	1 1/16	1.66	3/16	1 3/16
1½	6⅛	1 3/16	2⅞	2¾	1.61	1.95	1.97	1.99	2 11/16	1 3/16	1 3/16	1.90	¼	⅞
2	6½	⅞	3⅝	3 5/16	2.07	2.44	2.46	2.50	2¾	1 5/16	1 5/16	2.38	5/16	1⅛
2½	7½	1	4⅛	3 15/16	2.47	2.94	2.97	3.00	3	1½	1½	2.88	5/16	1¼
3	8¼	1⅛	5	4⅝	3.07	3.57	3.60	3.63	3⅛	1 11/16	1 11/16	3.50	⅜	1¼
3½	9	1 3/16	5½	5¼	3.55	4.07	4.10	4.13	3 3/16	1¾	1¾	4.00	⅜	1 7/16
4	10	1¼	6 3/16	5¾	4.03	4.57	4.60	4.63	3⅜	1⅞	1⅞	4.50	7/16	1 7/16
5	11	1⅜	7 5/16	7	5.05	5.66	5.69	5.69	3⅞	2	2	5.56	7/16	1 11/16
6	12½	1 7/16	8½	8⅛	6.07	6.72	6.75	6.75	3⅞	2 1/16	2 1/16	6.63	½	1 13/16
8	15	1⅝	10⅝	10¼	7.98	8.72	8.75	8.75	4⅜	2 7/16	2 7/16	8.63	½	2
10	17½	1⅞	12¾	12⅝	10.02	10.88	10.92	10.88	4⅝	2⅝	3¾	10.75	½	2 3/16
12	20½	2	15	14¾	12.00	12.88	12.92	12.94	5⅛	2⅞	4	12.75	½	2⅜
14	23	2⅛	16¼	16¾	13.25	14.14	14.18	14.19	5⅝	3	4⅜	14.00	½	2½
16	25½	2¼	18½	19	15.25	16.16	16.19	16.19	5¾	3¼	4¾	16.00	½	2 11/16
18	28	2⅜	21	21	17.25	18.18	18.20	18.19	6¼	3½	5⅛	18.00	½	2¾
20	30½	2½	23	23⅛	19.25	20.20	20.25	20.19	6⅜	3¾	5½	20.00	½	2⅞
22	33	2⅝	25¼	25¼	21.25	22.22	22.25	22.19	6½	4	5¾	22.00	½	3 1/16
24	36	2¾	27¼	27⅝	23.25	24.25	24.25	24.19	6⅝	4 3/16	6	24.00	½	3¼
MSS—SP44 Class 300														
26	38¼	3⅛	29½	28⅜	To be specified by purchaser	26.25	--	--	7¼	7¼	--	26¼	--	--
28	40¾	3⅜	31½	30½		28.25	--	--	7¾	7¾	--	28¼	--	--
30	43	3⅝	33¾	32 5/16		30.25	--	--	8¼	8¼	--	30¼	--	--
32	45¼	3⅞	36	34 11/16		32.25	--	--	8¾	8¾	--	32¼	--	--
34	47½	4	38	36⅞		34.25	--	--	9⅛	9⅛	--	34 5/16	--	--
36	50	4⅛	40¼	39		36.25	--	--	9½	9½	--	36 5/16	--	--

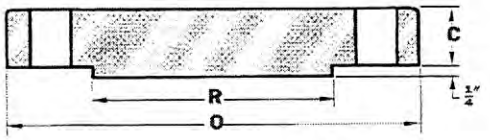
△ The 1/16" raised face is included in Thickness C and Length Y.

SOCKET WELDING TYPE

REDUCING FLANGES



LAP JOINT



BLIND

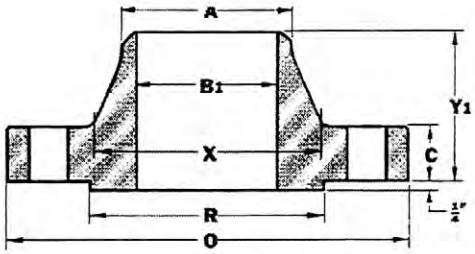
Drilling Template and Bolting

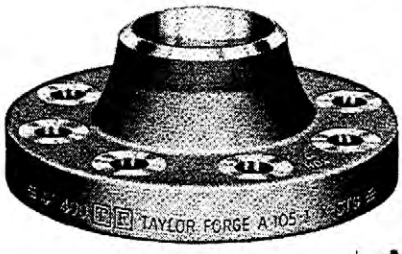
Nominal Pipe Size	DRILLING			BOLTING			
					Stud Bolt Length +		
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	¼" Raised Face	Male-Female Tongue-Groove	Ring Joint
½	2⅝	4	⅝	½	3	2¾	3
¾	3¼	4	¾	⅝	3¼	3	3¼
1	3½	4	¾	⅝	3½	3¼	3½
1¼	3⅞	4	¾	⅝	3¾	3½	3¾
1½	4½	4	⅞	¾	4	3¾	4
2	5	8	¾	⅝	4	3¾	4¼
2½	5⅞	8	⅞	¾	4½	4¼	4¾
3	6⅝	8	⅞	¾	4¾	4½	5
3½	7¼	8	1	⅞	5¼	5	5½
4	7⅞	8	1	⅞	5¼	5	5½
5	9¼	8	1	⅞	5½	5¼	5¾
6	10⅝	12	1	⅞	5¾	5½	6
8	13	12	1⅛	1	6½	6¼	6¾
10	15¼	16	1¼	1⅛	7¼	7	7½
12	17¾	16	1⅜	1¼	7¾	7½	8
14	20¼	20	1⅜	1¼	8	7¾	8¼
16	22½	20	1½	1⅜	8½	8¼	8¾
18	24¾	24	1½	1⅜	8¾	8½	9
20	27	24	1⅝	1½	9½	9¼	9¾
22	29¼	24	1¾	1⅝	10	9¾	10½
24	32	24	1⅞	1¾	10½	10¼	11
26	34½	28	1⅞	1¾	11½	- -	12
28	37	28	2	1⅞	12¼	- -	12¾
30	39¼	28	2⅛	2	13	- -	13½
32	41½	28	2⅛	2	13½	- -	14¼
34	43½	28	2⅛	2	13¾	- -	14½
36	46	32	2⅛	2	14	- -	14¾

All dimensions are in inches.

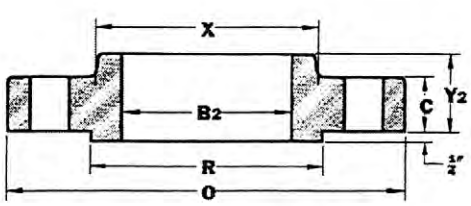
Weights

Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	2	2	2	2
¾	4	3	3	3
1	4	4	4	4
1¼	6	5	5	5
1½	8	7	7	8
2	12	9	9	10
2½	18	13	12	15
3	23	16	15	20
3½	26	21	20	29
4	35	26	25	33
5	43	31	29	44
6	57	44	42	61
8	89	67	64	100
10	125	91	110	155
12	175	130	150	225
14	230	180	205	290
16	295	235	260	370
18	350	285	315	455
20	425	345	385	585
22	505	405	455	720
24	620	510	570	890
26	750	650	- -	1125
28	880	780	- -	1425
30	1000	900	- -	1675
32	1150	1025	- -	1975
34	1300	1150	- -	2250
36	1475	1325	- -	2525

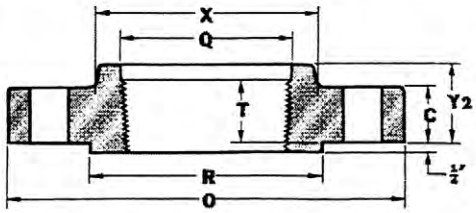




WELDING NECK



SLIP-ON



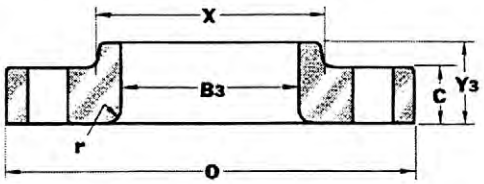
THREADED

Nominal Pipe Size	COMMON DIMENSIONS				BORE				LENGTH THRU HUB			Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.△
	Outside Diam.	Thickness Min.△	O.D. of Raised Face	Diam. at Base of Hub	Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck△	Slip-on and Thr'd△	Lap Joint			
	O	C	R	X	B1	B2	B3	Q	Y1	Y2	Y3	A	r	T
½	3¾	9/16	1⅜	1½	To be specified by purchaser	.88	.90	.93	2 1/16	⅞	⅞	.84	⅛	⅝
¾	4⅝	⅝	1 11/16	1⅞		1.09	1.11	1.14	2¼	1	1	1.05	⅛	⅝
1	4⅞	1 1/16	2	2⅛		1.36	1.38	1.41	2 7/16	1 1/16	1 1/16	1.32	⅛	1 1/16
1¼	5¼	13/16	2½	2½		1.70	1.72	1.75	2⅝	1⅛	1⅛	1.66	3/16	13/16
1½	6⅛	⅞	2⅞	2¾		1.95	1.97	1.99	2¾	1¼	1¼	1.90	¼	⅞
2	6½	1	3⅝	3 5/16		2.44	2.46	2.50	2⅞	1 7/16	1 7/16	2.38	5/16	1⅛
2½	7½	1⅛	4⅛	3 15/16		2.94	2.97	3.00	3⅛	1⅝	1⅝	2.88	5/16	1¼
3	8¼	1¼	5	4⅝		3.57	3.60	3.63	3¼	1 13/16	1 13/16	3.50	⅜	1⅜
3½	9	1⅜	5½	5¼		4.07	4.10	4.13	3⅜	1 15/16	1 15/16	4.00	⅜	1 9/16
4	10	1⅜	6 3/16	5¾		4.57	4.60	4.63	3½	2	2	4.50	7/16	1 7/16
5	11	1½	7 5/16	7		5.66	5.69	5.69	4	2⅛	2⅛	5.56	7/16	1 11/16
6	12½	1⅝	8½	8⅛		6.72	6.75	6.75	4 1/16	2¼	2¼	6.63	½	1 13/16
8	15	1⅞	10⅝	10¼		8.72	8.75	8.75	4⅝	2 11/16	2 11/16	8.63	½	2
10	17½	2⅛	12¾	12⅝		10.88	10.92	10.88	4⅞	2⅞	4	10.75	½	2 3/16
12	20½	2¼	15	14¾		12.88	12.92	12.94	5⅜	3⅛	4¼	12.75	½	2⅜
14	23	2⅜	16¼	16¾		14.14	14.18	14.19	5⅞	3 5/16	4⅝	14.00	½	2½
16	25½	2½	18½	19		16.16	16.19	16.19	6	3 11/16	5	16.00	½	2 11/16
18	28	2⅝	21	21		18.18	18.20	18.19	6½	3⅞	5⅜	18.00	½	2¾
20	30½	2¾	23	23⅛		20.20	20.25	20.19	6⅝	4	5¾	20.00	½	2⅞
22	33	2⅞	25¼	25¼		22.22	22.25	22.19	6¾	4¼	6	22.00	½	3 1/16
24	36	3	27¼	27⅝		24.25	24.25	24.19	6⅞	4½	6¼	24.00	½	3¼
26	38¼	3½	29½	28⅝	To be specified by purchaser	26.25	--	--	7⅝	7⅝	--	26 5/16	--	--
28	40¾	3¾	31½	30 13/16		28.25	--	--	8⅛	8⅛	--	28 5/16	--	--
30	43	4	33¾	32 5/16		30.25	--	--	8⅝	8⅝	--	30 5/16	--	--
32	45¼	4¼	36	35		32.25	--	--	9⅛	9⅛	--	32⅜	--	--
34	47½	4⅜	38	37 3/16		34.25	--	--	9½	9½	--	34⅜	--	--
36	50	4½	40¼	39⅜		36.25	--	--	9⅞	9⅞	--	36 7/16	--	--

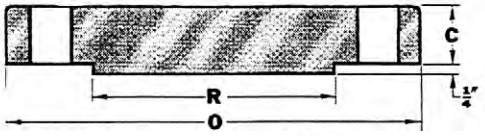
△ The ¼" raised face is not included in Thickness C, Length Y or Thread Length T.

SOCKET WELDING TYPE

REDUCING FLANGES



LAP JOINT



BLIND

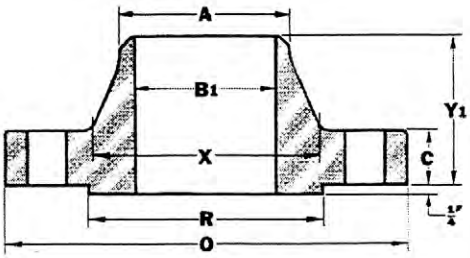
Drilling Template and Bolting

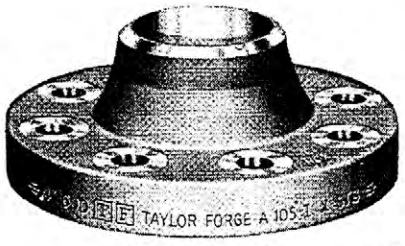
Nominal Pipe Size	DRILLING			BOLTING			
					Stud Bolt Length +		
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	¼" Raised Face	Male-Female Tongue-Groove	Ring Joint
½	2⅝	4	⅝	½	3	2¾	3
¾	3¼	4	¾	⅝	3¼	3	3¼
1	3½	4	¾	⅝	3½	3¼	3½
1¼	3⅞	4	¾	⅝	3¾	3½	3¾
1½	4½	4	⅞	¾	4	3¾	4
2	5	8	¾	⅝	4	3¾	4¼
2½	5⅞	8	⅞	¾	4½	4¼	4¾
3	6⅝	8	⅞	¾	4¾	4½	5
3½	7¼	8	1	⅞	5¼	5	5½
4	8½	8	1	⅞	5½	5¼	5¾
5	10½	8	1⅛	1	6¼	6	6½
6	11½	12	1⅛	1	6½	6¼	6¾
8	13¾	12	1¼	1⅛	7½	7¼	7¾
10	17	16	1⅜	1¼	8¼	8	8½
12	19¼	20	1⅜	1¼	8½	8¼	8¾
14	20¾	20	1½	1⅜	9	8¾	9¼
16	23¾	20	1⅝	1½	9¾	9½	10
18	25¾	20	1¾	1⅝	10½	10¼	10¾
20	28½	24	1¾	1⅝	11¼	11	11½
22	30⅝	24	1⅞	1¾	12	11¾	12½
24	33	24	2	1⅞	12¾	12½	13¼
26	36	28	2	1⅞	13¼	- -	13¾
28	38	28	2⅛	2	13¾	- -	14¼
30	40¼	28	2⅛	2	14	- -	14½
32	42½	28	2⅜	2¼	14¾	- -	15½
34	44½	28	2⅜	2¼	15	- -	15¾
36	47	28	2⅝	2½	15¾	- -	16½

Weights

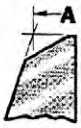
Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	2	2	2	2
¾	4	3	3	3
1	4	4	4	4
1¼	6	5	5	5
1½	8	7	7	8
2	12	9	9	10
2½	18	13	12	15
3	23	16	15	20
3½	26	21	20	29
4	42	37	36	41
5	68	63	61	68
6	81	80	78	86
8	120	115	110	140
10	190	170	170	230
12	225	200	200	295
14	280	230	250	355
16	390	330	365	495
18	475	400	435	630
20	590	510	570	810
22	720	590	670	1000
24	830	730	810	1250
26	1025	950	- -	1525
28	1175	1075	- -	1750
30	1300	1175	- -	2000
32	1500	1375	- -	2300
34	1650	1500	- -	2575
36	1750	1600	- -	2950

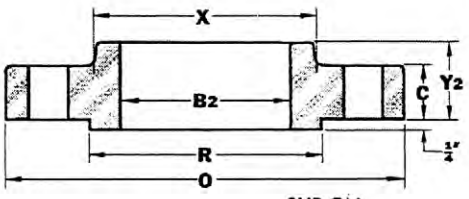
All dimensions are in inches.



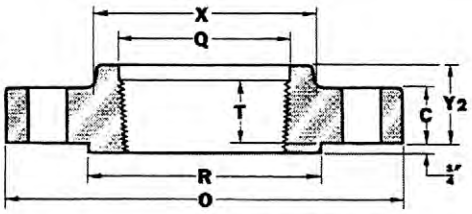


WELDING NECK





SLIP-ON



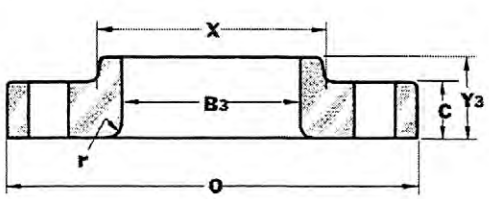
THREADED

Nominal Pipe Size	COMMON DIMENSIONS				BORE				LENGTH THRU HUB			Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.△
	Outside Diam.	Thickness Min.△	O.D. of Raised Face	Diam. at Base of Hub	Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck△	Slip-on and Thr'd△	Lap Joint			
	O	C	R	X	B1	B2	B3	Q	Y1	Y2	Y3	A	r	T
½	3¾	9/16	1⅜	1½	To be specified by purchaser	.88	.90	.93	2 1/16	⅞	⅞	.84	⅛	⅝
¾	4⅝	⅝	1 11/16	1⅞		1.09	1.11	1.14	2¼	1	1	1.05	⅛	⅝
1	4⅞	1 1/16	2	2⅛		1.36	1.38	1.41	2 7/16	1 1/16	1 1/16	1.32	⅛	1 1/16
1¼	5¼	13/16	2½	2½		1.70	1.72	1.75	2⅝	1⅛	1⅛	1.66	3/16	13/16
1½	6⅛	⅞	2⅞	2¾		1.95	1.97	1.99	2¾	1¼	1¼	1.90	¼	⅞
2	6½	1	3⅜	3 5/16		2.44	2.46	2.50	2⅞	1 7/16	1 7/16	2.38	5/16	1⅛
2½	7½	1⅛	4⅛	3 15/16		2.94	2.97	3.00	3⅛	1⅝	1⅝	2.88	5/16	1¼
3	8¼	1¼	5	4⅝		3.57	3.60	3.63	3¼	1 13/16	1 13/16	3.50	⅜	1⅜
3½	9	1⅜	5½	5¼		4.07	4.10	4.13	3⅜	1 15/16	1 15/16	4.00	⅜	1 9/16
4	10¾	1½	6 3/16	6		4.57	4.60	4.63	4	2⅛	2⅛	4.50	7/16	1⅝
5	13	1¾	7 5/16	7 7/16		5.66	5.69	5.69	4½	2⅜	2⅜	5.56	7/16	1⅞
6	14	1⅞	8½	8¾		6.72	6.75	6.75	4⅝	2⅝	2⅝	6.63	½	2
8	16½	2 3/16	10⅝	10¾		8.72	8.75	8.75	5¼	3	3	8.63	½	2¼
10	20	2½	12¾	13½		10.88	10.92	10.88	6	3⅜	4⅜	10.75	½	2 9/16
12	22	2⅝	15	15¾		12.88	12.92	12.94	6⅛	3⅝	4⅝	12.75	½	2¾
14	23¾	2¾	16¼	17		14.14	14.18	14.19	6½	3 11/16	5	14.00	½	2⅞
16	27	3	18½	19½		16.16	16.19	16.19	7	4 3/16	5½	16.00	½	3 1/16
18	29¼	3¼	21	21½		18.18	18.20	18.19	7¼	4⅜	6	18.00	½	3⅛
20	32	3½	23	24		20.20	20.25	20.19	7½	5	6½	20.00	½	3¼
22	34¼	3¾	25¼	26¼		22.22	22.25	22.19	7¾	5¼	6⅞	22.00	½	3 7/16
24	37	4	27¼	28¼		24.25	24.25	24.19	8	5½	7¼	24.00	½	3⅝
MSS—SP44 Class 600														
26	40	4¼	29½	29 7/16	To be specified by purchaser	26.25	--	--	8¾	8¾	--	26 7/16	--	--
28	42¼	4⅜	31½	31⅝		28.25	--	--	9¼	9¼	--	28½	--	--
30	44½	4½	33¾	33 15/16		30.25	--	--	9¾	9¾	--	30½	--	--
32	47	4⅜	36	36⅛		32.25	--	--	10¼	10¼	--	32½	--	--
34	49	4¾	38	38 5/16		34.25	--	--	10⅝	10⅝	--	34 5/16	--	--
36	51¾	4⅞	40¼	40⅝		36.25	--	--	11⅛	11⅛	--	36 9/16	--	--

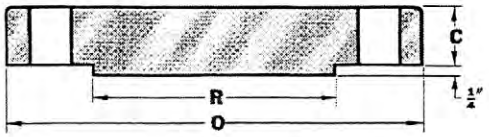
△ The ¼" raised face is not included in Thickness C, Length Y or Thread Length T.

SOCKET WELDING TYPE

REDUCING FLANGES



LAP JOINT



BLIND

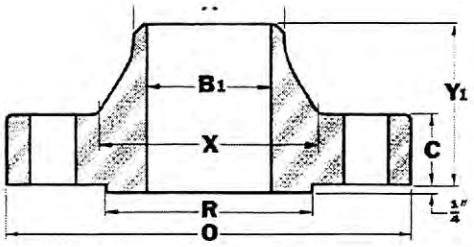
Drilling Template and Bolting

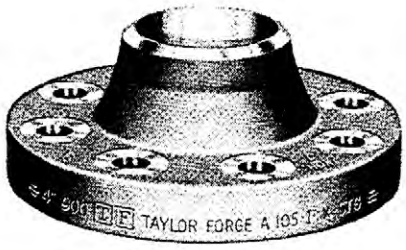
Nominal Pipe Size	DRILLING			BOLTING			
					Stud Bolt Length +		
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	¼" Raised Face	Male-Female Tongue-Groove	Ring Joint
½	3¼	4	⅞	¾	4	3¾	4
¾	3½	4	⅞	¾	4¼	4	4¼
1	4	4	1	⅞	4¾	4½	4¾
1¼	4⅜	4	1	⅞	4¾	4½	4¾
1½	4⅞	4	1⅛	1	5¼	5	5¼
2	6½	8	1	⅞	5½	5¼	5¾
2½	7½	8	1⅛	1	6	5¾	6¼
3	7½	8	1	⅞	5½	5¼	5¾
4	9¼	8	1¼	1⅛	6½	6¼	6¾
5	11	8	1⅜	1¼	7¼	7	7½
6	12½	12	1¼	1⅛	7½	7¼	7½
8	15½	12	1½	1⅜	8½	8¼	8¾
10	18½	16	1½	1⅜	9	8¾	9¼
12	21	20	1½	1⅜	9¾	9½	10
14	22	20	1⅝	1½	10½	10¼	11
16	24¼	20	1¾	1⅝	11	10¾	11½
18	27	20	2	1⅞	12¾	12½	13¼
20	29½	20	2⅛	2	13½	13¼	14
24	35½	20	2⅝	2½	17	16¾	17¾
26	37½	20	2⅞	2¾	17½	--	18¾
28	40¼	20	3⅛	3	18¼	--	19½
30	42¾	20	3⅛	3	18¾	--	20
32	45½	20	3⅜	3¼	20	--	21¼
34	48¼	20	3⅝	3½	21	--	22½
36	50¾	20	3⅝	3½	21½	--	23

All dimensions are in inches.

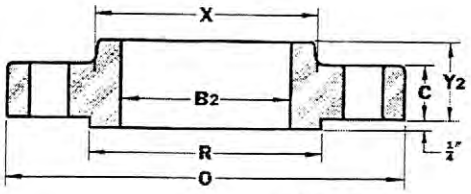
Weights

Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	5	4	4	4
¾	6	5	5	6
1	9	8	8	8
1¼	10	9	9	9
1½	13	12	12	13
2	25	25	25	25
2½	36	36	35	35
3	31	26	25	29
4	51	53	51	54
5	86	83	81	87
6	110	110	105	115
8	175	170	190	200
10	260	245	275	290
12	325	325	370	415
14	400	400	415	520
16	495	425	465	600
18	680	600	650	850
20	830	730	810	1075
24	1500	1400	1550	2025
26	1575	1525	--	2200
28	1850	1800	--	2575
30	2150	2075	--	3025
32	2575	2500	--	3650
34	3025	2950	--	4275
36	3450	3350	--	4900

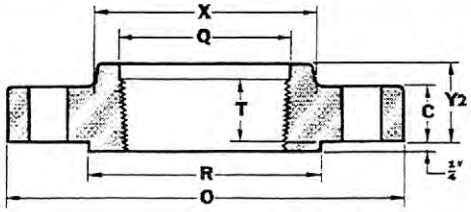




WELDING NECK



SLIP-ON



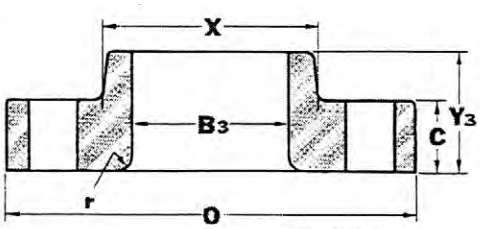
THREADED

Nominal Pipe Size	COMMON DIMENSIONS				BORE				LENGTH THRU HUB			Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.△
	Outside Diam.	Thickness Min.△	O.D. of Raised Face	Diam. at Base of Hub	Welding Neck	Slip-on	Lap Joint	Counter Bore Min.	Welding Neck△	Slip-on and Thr'd△	Lap Joint			
	O	C	R	X	B1	B2	B3	Q	Y1	Y2	Y3	A	r	T
½	4¾	⅞	1⅜	1½	To be specified by purchaser	.88	.90	.93	2⅜	1¼	1¼	.84	⅛	⅞
¾	5⅛	1	1 11/16	1¾		1.09	1.11	1.14	2¾	1⅜	1⅜	1.05	⅛	1
1	5⅞	1⅛	2	2 1/16		1.36	1.38	1.41	2⅞	1⅝	1⅝	1.32	⅛	1⅛
1¼	6¼	1⅛	2½	2½		1.70	1.72	1.75	2⅞	1⅝	1⅝	1.66	3/16	1 3/16
1½	7	1¼	2⅞	2¾		1.95	1.97	1.99	3¼	1¾	1¾	1.90	¼	1¼
2	8½	1½	3⅝	4⅛		2.44	2.46	2.50	4	2¼	2¼	2.38	5/16	1½
2½	9⅝	1⅝	4⅛	4⅞		2.94	2.97	3.00	4⅛	2½	2½	2.88	5/16	1⅞
3	9½	1½	5	5		3.57	3.60	3.63	4	2⅛	2⅛	3.50	⅜	1⅝
4	11½	1¾	6 3/16	6¼		4.57	4.60	4.63	4½	2¾	2¾	4.50	7/16	1⅞
5	13¾	2	7 5/16	7½		5.66	5.69	5.69	5	3⅛	3⅛	5.56	7/16	2⅛
6	15	2 3/16	8½	9¼		6.72	6.75	6.75	5½	3⅜	3⅜	6.63	½	2¼
8	18½	2½	10⅝	11¾		8.72	8.75	8.75	6⅜	4	4½	8.63	½	2½
10	21½	2¾	12¾	14½		10.88	10.92	10.88	7¼	4¼	5	10.75	½	2 13/16
12	24	3⅛	15	16½		12.88	12.92	12.94	7⅞	4⅝	5⅝	12.75	½	3
14	25¼	3⅜	16¼	17¾		14.14	14.18	14.19	8⅜	5⅛	6⅛	14.00	½	3¼
16	27¾	3½	18½	20		16.16	16.19	16.19	8½	5¼	6½	16.00	½	3⅜
18	31	4	21	22¼		18.18	18.20	18.19	9	6	7½	18.00	½	3½
20	33¾	4¼	23	24½		20.20	20.25	20.19	9¾	6¼	8¼	20.00	½	3⅝
24	41	5½	27¼	29½		24.25	24.25	24.19	11½	8	10½	24.00	½	4
MSS—SP44 Class 900														
26	42¾	5½	29½	30½	To be specified by purchaser	26.25	--	--	11¼	11¼	--	26⅝	--	--
28	46	5⅝	31½	32¾		28.25	--	--	11¾	11¾	--	28 1/16	--	--
30	48½	5⅞	33¾	35		30.25	--	--	12¼	12¼	--	30¾	--	--
32	51¾	6¼	36	37¼		32.25	--	--	13	13	--	32¾	--	--
34	55	6½	38	39⅝		34.25	--	--	13¾	13¾	--	34 13/16	--	--
36	57½	6¾	40¼	41⅞		36.25	--	--	14¼	14¼	--	36⅞	--	--

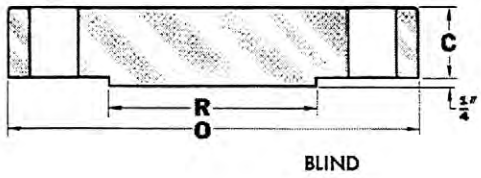
△ The ¼" raised face is not included in Thickness C, Length Y or Thread Length T.

SOCKET WELDING TYPE

REDUCING FLANGES



LAP JOINT



BLIND

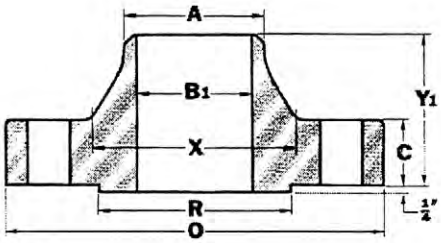
Drilling Template and Bolting

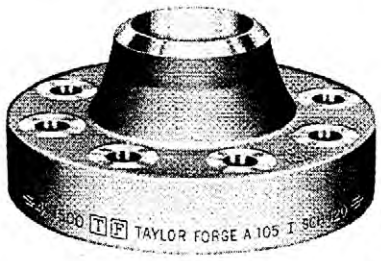
Nominal Pipe Size	DRILLING			BOLTING			
					Stud Bolt Length+		
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	¼" Raised Face	Male-Female Tongue-Groove	Ring Joint
½	3¼	4	⅞	¾	4	3¾	4
¾	3½	4	⅞	¾	4¼	4	4¼
1	4	4	1	⅞	4¾	4½	4¾
1¼	4⅜	4	1	⅞	4¾	4½	4¾
1½	4⅞	4	1⅛	1	5¼	5	5¼
2	6½	8	1	⅞	5½	5¼	5¾
2½	7½	8	1⅛	1	6	5¾	6¼
3	8	8	1¼	1⅛	6¾	6½	7
4	9½	8	1⅜	1¼	7½	7¼	7¾
5	11½	8	1⅜	1½	9½	9¼	9¾
6	12½	12	1½	1⅜	10	9¾	10¼
8	15½	12	1¾	1⅝	11¼	11	11¾
10	19	12	2	1⅞	13¼	13	13½
12	22½	16	2⅛	2	14¾	14½	15¼
14	25	16	2⅜	2¼	16	15¾	16¾
16	27¾	16	2⅝	2½	17½	17¼	18½
18	30½	16	2⅞	2¾	19¼	19	20¼
20	32¾	16	3⅛	3	21	20¾	22¼
24	39	16	3⅝	3½	24	23¾	25½

All dimensions are in inches.

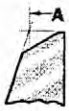
Weights

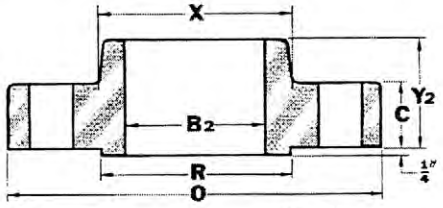
Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	5	4	4	4
¾	6	5	5	6
1	9	8	8	8
1¼	10	9	9	9
1½	13	12	12	13
2	25	25	25	25
2½	36	36	35	35
3	48	48	47	48
4	73	73	75	73
5	130	130	140	140
6	165	165	170	160
8	275	260	285	300
10	455	435	485	510
12	690	580	630	690
14	940	- -	890	975
16	1250	- -	1150	1300
18	1625	- -	1475	1750
20	2050	- -	1775	2225
24	3325	- -	2825	3625



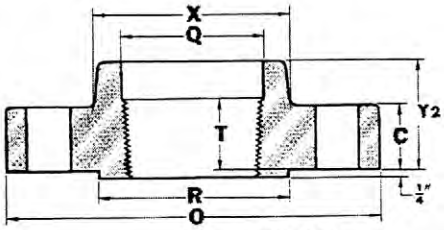


WELDING NECK





SLIP-ON

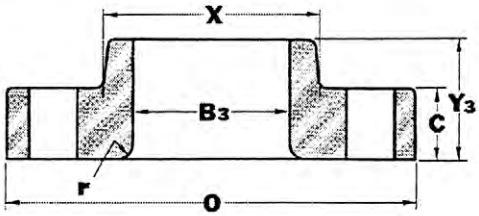


THREADED

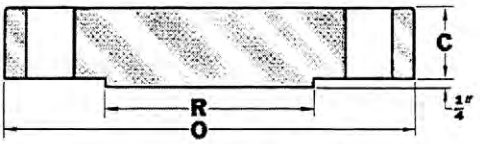
Nominal Pipe Size	COMMON DIMENSIONS				BORE				LENGTH THRU HUB					
	Outside Diam.	Thick-ness Min.△	O.D. of Raised Face	Diam. at Base of Hub	Weld-ing Neck	Slip-on	Lap Joint	Counter Bore Min.	Weld-ing Neck△	Slip-on and Thr'd△	Lap Joint	Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.△
	O	C	R	X	B1	B2	B3	Q	Y1	Y2	Y3	A	r	T
½	4¾	⅞	1⅜	1½	To be specified by purchaser	.88	.90	.93	2⅜	1¼	1¼	.84	⅛	⅞
¾	5⅛	1	1 11/16	1¾		1.09	1.11	1.14	2¾	1⅜	1⅜	1.05	⅛	1
1	5⅞	1⅛	2	2 1/16		1.36	1.38	1.41	2⅞	1⅝	1⅝	1.32	⅛	1⅛
1¼	6¼	1⅛	2½	2½		1.70	1.72	1.75	2⅞	1⅝	1⅝	1.66	3/16	1 3/16
1½	7	1¼	2⅞	2¾		1.95	1.97	1.99	3¼	1¾	1¾	1.90	¼	1¼
2	8½	1½	3⅝	4⅛		2.44	2.46	2.50	4	2¼	2¼	2.38	5/16	1½
2½	9⅝	1⅝	4⅛	4⅞		2.94	2.97	3.00	4⅛	2½	2½	2.88	5/16	1⅞
3	10½	1⅞	5	5¼		3.57	3.60	3.63	4⅝	2⅞	2⅞	3.50	⅜	2
4	12¼	2⅛	6 3/16	6⅜		4.57	4.60	4.63	4⅞	3 11/16	3 11/16	4.50	7/16	2¼
5	14¾	2⅞	7 5/16	7¾		5.66	5.69	5.69	6⅛	4⅛	4⅛	5.56	7/16	2½
6	15½	3¼	8½	9		6.72	6.75	6.75	6¾	4 11/16	4 11/16	6.63	½	2¾
8	19	3⅝	10⅝	11½		8.72	8.75	8.75	8⅜	5⅝	5⅝	8.63	½	3
10	23	4¼	12¾	14½		10.88	10.92	10.88	10	6¼	7	10.75	½	3 5/16
12	26½	4⅞	15	17¾		12.88	12.92	12.94	11⅛	7⅛	8⅝	12.75	½	3⅝
14	29½	5¼	16¼	19½		--	14.18	--	11¾	--	9½	14.00	½	--
16	32½	5¾	18½	21¾		--	16.19	--	12¼	--	10¼	16.00	½	--
18	36	6⅜	21	23½		--	18.20	--	12⅞	--	10⅞	18.00	½	--
20	38¾	7	23	25¼		--	20.25	--	14	--	11½	20.00	½	--
24	46	8	27¼	30		--	24.25	--	16	--	13	24.00	½	--

△ The ¼" raised face is not included in Thickness C, Length Y or Thread Length T.

REDUCING FLANGES



LAP JOINT



BLIND

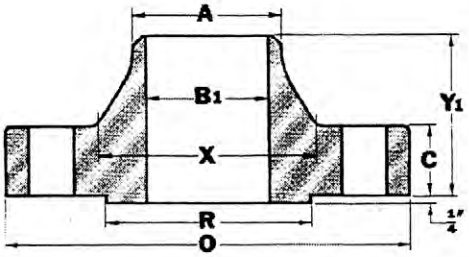
Drilling Template and Bolting

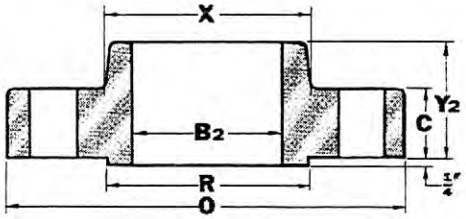
Nominal Pipe Size	DRILLING			BOLTING			
					Stud Bolt Length+		
	Bolt Circle Diam.	Number of Holes	Diam. of Holes	Diam. of Bolts	¼" Raised Face	Male-Female Tongue-Groove	Ring Joint
½	3½	4	⅞	¾	4¾	4½	4¾
¾	3¾	4	⅞	¾	4¾	4½	4¾
1	4¼	4	1	⅞	5¼	5	5¼
1¼	5⅛	4	1⅛	1	5¾	5½	6
1½	5¾	4	1¼	1⅛	6½	6¼	6¾
2	6¾	8	1⅛	1	6¾	6½	7
2½	7¾	8	1¼	1⅛	7½	7¼	7¾
3	9	8	1⅜	1¼	8½	8¼	8¾
4	10¾	8	1⅝	1½	9¾	9½	10¼
5	12¾	8	1⅞	1¾	11½	11¼	12¼
6	14½	8	2⅛	2	13½	13¼	14
8	17¼	12	2⅛	2	15	14¾	15½
10	21¼	12	2⅝	2½	19	18¾	20
12	24⅜	12	2⅞	2¾	21	20¾	22

All dimensions are in inches.

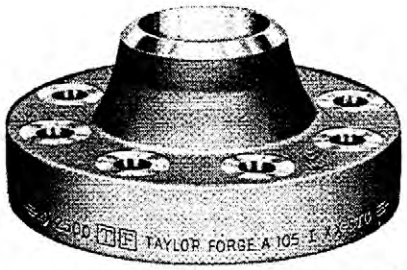
Weights

Nominal Pipe Size	APPROXIMATE WEIGHT EACH—POUNDS			
	Welding Neck	Slip-on and Thr'd	Lap Joint	Blind
½	7	7	7	7
¾	8	8	8	8
1	12	11	11	11
1¼	17	16	16	17
1½	25	22	22	23
2	42	38	37	39
2½	52	55	53	56
3	94	83	80	86
4	145	125	120	135
5	245	210	205	225
6	380	325	315	345
8	580	485	470	530
10	1075	930	900	1025
12	1525	1100	1100	1300

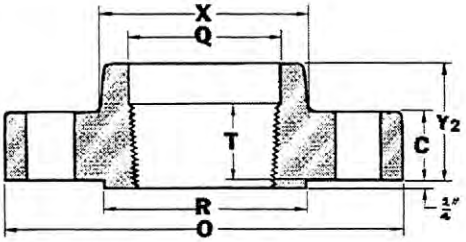




SLIP-ON



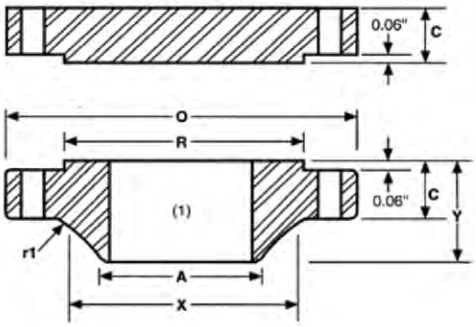
WELDING NECK



THREADED

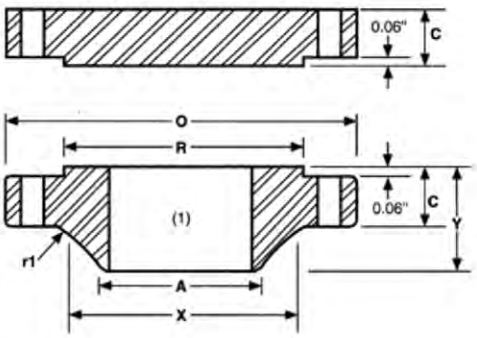
Nominal Pipe Size	COMMON DIMENSIONS				BORE				LENGTH THRU HUB					
	Outside Diam.	Thick-ness Min.△	O.D. of Raised Face	Diam. at Base of Hub	Weld-ing Neck	Slip-on	Lap Joint	Counter Bore Min.	Weld-ing Neck△	Slip-on and Thr'd△	Lap Joint	Diam. Hub at Bevel	Radius of Fillet	Thread Length Min.△
	O	C	R	X	B1	B2	B3	Q	Y1	Y2	Y3	A	r	T
½	5¼	1³⁄₁₆	1⅜	1¹¹⁄₁₆	To be specified by purchaser	.88	.90	.93	2⅞	1⁹⁄₁₆	1⁹⁄₁₆	.84	⅛	1⅛
¾	5½	1¼	1¹¹⁄₁₆	2		1.09	1.11	1.14	3⅛	1¹¹⁄₁₆	1¹¹⁄₁₆	1.05	⅛	1¼
1	6¼	1⅜	2	2¼		1.36	1.38	1.41	3½	1⅞	1⅞	1.32	⅛	1⅜
1¼	7¼	1½	2½	2⅞		1.70	1.72	1.75	3¾	2¹⁄₁₆	2¹⁄₁₆	1.66	³⁄₁₆	1½
1½	8	1¾	2⅞	3⅛		1.95	1.97	1.99	4⅛	2⅜	2⅜	1.90	¼	1¾
2	9¼	2	3⅝	3¾		2.44	2.46	2.50	5	2¾	2¾	2.38	⁵⁄₁₆	2
2½	10½	2¼	4⅛	4½		2.94	2.97	3.00	5⅝	3⅛	3⅛	2.88	⅝	2¼
3	12	2⅝	5	5¼		3.57	3.60	3.63	6⅝	3⅜	3⅜	3.50	⅜	2½
4	14	3	6³⁄₁₆	6½		4.57	4.60	4.63	7½	4¼	4¼	4.50	⅞	2¾
5	16½	3⅝	7⁵⁄₁₆	8		5.66	5.69	5.69	9	5⅛	5⅛	5.56	⅞	3
6	19	4¼	8½	9¼		6.72	6.75	6.75	10¾	6	6	6.63	½	3¼
8	21¾	5	10⅝	12		8.72	8.75	8.75	12½	7	7	8.63	½	3¾
10	26½	6½	12¾	14¾		10.88	10.92	10.88	16½	9	9	10.75	½	4¼
12	30	7¼	15	17⅜		12.88	12.92	12.94	18¼	10	10	12.75	½	4¾

△ The ¼" raised face is not included in Thickness C, Length Y or Thread Length T.



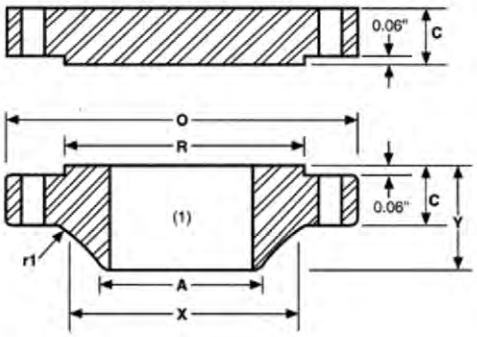
Class 150

Nom. Size		O	WNF	BLIND	Y	X	A	R	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	R1
in.	26"	34.25	2.69	2.69	4.75	26.62	26	29.5	31.75	24	1.38	1 1/4	0.38
mm.		870	68.3	68.3	120.7	676.1	660.4	749.3	806.5		35.1	31.8	9.7
in.	28"	36.5	2.81	2.81	4.94	28.62	28	31.5	34	28	1.38	1 1/4	0.44
mm.		927.1	71.4	71.4	125.5	726.9	711.2	800.1	863.6		35.1	31.8	11.2
in.	30"	38.75	2.94	2.94	5.38	30.75	30	33.75	36	28	1.38	1 1/4	0.44
mm.		984.3	74.7	74.7	136.7	781.1	762	857.3	914.4		35.1	31.8	11.2
in.	32"	41.75	3.19	3.19	5.69	32.75	32	36	38.5	28	1.62	1 1/2	0.44
mm.		1060.5	81	81	144.5	831.9	812.8	914.4	977.9		41.1	38.1	11.2
in.	34"	43.75	3.25	3.25	5.88	34.75	34	38	40.5	32	1.62	1 1/2	0.5
mm.		1111.3	82.6	82.6	149.4	882.7	863.6	965.2	1028.7		41.1	38.1	12.7
in.	36"	46	3.56	3.56	6.19	36.75	36	40.25	42.75	32	1.62	1 1/2	0.5
mm.		1168.4	90.4	90.4	157.2	933.5	914.4	1022.4	1085.9		41.1	38.1	12.7
in.	38"	48.75	3.44	3.44	6.19	39	38	42.25	45.25	32	1.62	1 1/2	0.5
mm.		1238.3	87.4	87.4	157.2	990.6	965.2	1073.2	1149.4		41.1	38.1	12.7
in.	40"	50.75	3.56	3.56	6.44	41	40	44.25	47.25	36	1.62	1 1/2	0.5
mm.		1289.1	90.4	90.4	163.6	1041.4	1016	1124	1200.2		41.1	38.1	12.7
in.	42"	53	3.81	3.81	6.75	43	42	47	49.5	36	1.62	1 1/2	0.5
mm.		1346.2	96.8	96.8	171.5	1092.2	1066.8	1193.8	1257.3		41.1	38.1	12.7
in.	44"	55.25	4	4	7	45	44	49	51.75	40	1.62	1 1/2	0.5
mm.		1403.4	101.6	101.6	177.8	1143	1117.6	1244.6	1314.5		41.1	38.1	12.7
in.	46"	57.25	4.06	4.06	7.31	47.12	46	51	53.75	40	1.62	1 1/2	0.5
mm.		1454.2	103.1	103.1	185.7	1196.8	1168.4	1295.4	1365.3		41.1	38.1	12.7
in.	48"	59.5	4.25	4.25	7.56	49.12	48	53.5	56	44	1.62	1 1/2	0.5
mm.		1511.3	108	108	192	1247.6	1219.2	1358.9	1422.4		41.1	38.1	12.7
in.	50"	61.75	4.38	4.38	8	51.25	50	55.5	58.25	44	1.88	1 3/4	0.5
mm.		1568.5	111.3	111.3	203.2	1301.8	1270	1409.7	1479.6		47.8	44.5	12.7
in.	52"	64	4.56	4.56	8.25	53.25	52	57.5	60.25	44	1.88	1 3/4	0.5
mm.		1625.6	115.8	115.8	209.6	1352.6	1320.8	1460.5	1530.4		47.8	44.5	12.7
in.	54"	66.25	4.75	4.75	8.5	55.25	54	59.5	62.75	44	1.88	1 3/4	0.5
mm.		1682.8	120.7	120.7	215.9	1403.4	1371.6	1511.3	1593.9		47.8	44.5	12.7
in.	56"	68.75	4.88	4.88	9	57.38	56	62	65	48	1.88	1 3/4	0.5
mm.		1746.3	124	124	228.6	1457.5	1422.4	1574.8	1651		47.8	44.5	12.7
in.	58"	71	5.06	5.06	9.25	59.38	58	64	67.25	48	1.88	1 3/4	0.5
mm.		1803.4	128.5	128.5	235	1508.3	1473.2	1625.6	1708.2		47.8	44.5	12.7
in.	60"	73	5.19	5.19	9.44	61.38	60	66	69.25	52	1.88	1 3/4	0.5
mm.		1854.2	131.8	131.8	239.8	1559.1	1524	1676.4	1759		47.8	44.5	12.7



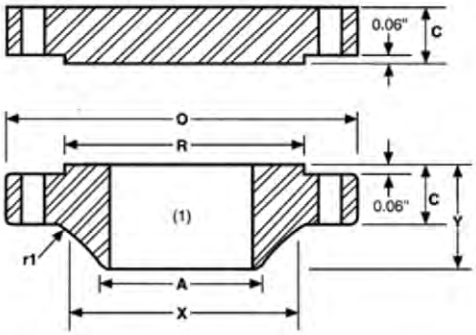
Class 300

Nom. Size		O	WNF	BLIND	Y	X	A	R	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	R1
in.	26"	38.25	3.12	3.31	7.25	28.38	26	29.5	34.5	28	1.75	1 5/8	0.38
mm.		971.6	79.2	84.1	184.2	720.9	660.4	749.3	876.3		44.5	41.4	9.7
in.	28"	40.75	3.38	3.56	7.75	30.5	28	31.5	37	28	1.75	1 5/8	0.44
mm.		1035.1	85.9	90.4	196.9	774.7	711.2	800.1	939.8		44.5	41.4	11.2
in.	30"	43	3.62	3.75	8.25	32.56	30	33.75	39.25	28	1.88	1 3/4	0.44
mm.		1092.2	91.9	95.3	209.6	827	762	857.3	997		47.8	44.5	11.2
in.	32"	45.25	3.88	3.94	8.75	34.69	32	36	41.5	28	2	1 7/8	0.44
mm.		1149.4	98.6	100.1	222.3	881.1	812.8	914.4	1054.1		50.8	47.8	11.2
in.	34"	47.5	4	4.12	9.12	36.88	34	38	43.5	28	2	1 7/8	0.5
mm.		1206.5	101.6	104.6	231.6	936.8	863.6	965.2	1104.9		50.8	47.8	12.7
in.	36"	50	4.12	4.38	9.5	39	36	40.25	46	32	2.12	2	0.5
mm.		1270	104.6	111.3	241.3	990.6	914.4	1022.4	1168.4		53.8	50.8	12.7
in.	38"	46	4.25	4.25	7.12	39.12	38	40.5	43	32	1.62	1 1/2	0.5
mm.		1168.4	108	108	180.8	993.6	965.2	1028.7	1092.2		41.1	38.1	12.7
in.	40"	48.75	4.5	4.5	7.62	41.12	40	42.75	45.5	32	1.75	1 5/8	0.5
mm.		1238.3	114.3	114.3	193.5	1044.4	1016	1085.9	1155.7		44.5	41.4	12.7
in.	42"	50.75	4.69	4.69	7.88	43.25	42	44.75	47.5	32	1.75	1 5/8	0.5
mm.		1289.1	119.1	119.1	200.2	1098.6	1066.8	1136.7	1206.5		44.5	41.4	12.7
in.	44"	53.25	4.88	4.88	8.12	45.25	44	47	49.75	32	1.88	1 3/4	0.5
mm.		1352.6	124	124	206.2	1149.4	1117.6	1193.8	1263.7		47.8	44.5	12.7
in.	46"	55.75	5.06	5.06	8.5	47.38	46	49	52	28	2	1 7/8	0.5
mm.		1416.1	128.5	128.5	215.9	1203.5	1168.4	1244.6	1320.8		50.8	47.8	12.7
in.	48"	57.75	5.25	5.25	8.81	49.38	48	51.25	54	32	2	1 7/8	0.5
mm.		1466.9	133.4	133.4	223.8	1254.3	1219.2	1301.8	1371.6		50.8	47.8	12.7
in.	50"	60.25	5.5	5.5	9.12	51.38	50	53.5	56.25	32	2.12	2	0.5
mm.		1530.4	139.7	139.7	231.6	1305.1	1270	1358.9	1428.8		53.8	50.8	12.7
in.	52"	62.25	5.69	5.69	9.38	53.38	52	55.5	58.25	32	2.12	2	0.5
mm.		1581.2	144.5	144.5	238.3	1355.9	1320.8	1409.7	1479.6		53.8	50.8	12.7
in.	54"	65.25	6	6	9.94	55.5	54	57.75	61	28	2.38	2 1/4	0.5
mm.		1657.4	152.4	152.4	252.5	1409.7	1371.6	1466.9	1549.4		60.5	57.2	12.7
in.	56"	67.25	6.06	6.06	10.25	57.62	56	59.75	63	28	2.38	2 1/4	0.5
mm.		1708.2	153.9	153.9	260.4	1463.5	1422.4	1517.7	1600.2		60.5	57.2	12.7
in.	58"	69.25	6.25	6.25	10.5	59.62	58	62	65	32	2.38	2 1/4	0.5
mm.		1759	158.8	158.8	266.7	1514.3	1473.2	1574.8	1651		60.5	57.2	12.7
in.	60"	71.25	6.44	6.44	10.75	61.62	60	64	67	32	2.38	2 1/4	0.5
mm.		1809.8	163.6	163.6	273.1	1565.1	1524	1625.6	1701.8		60.5	57.2	12.7



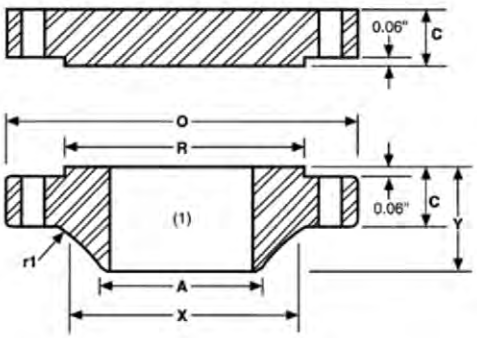
Class 400

Nom. Size		O	WNF	BLIND	Y	X	A	R	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	R1
in.	26"	38.25	3.5	3.88	7.62	28.62	26	29.5	34.5	28	1.88	1 3/4	0.44
mm.		971.6	88.9	98.6	193.5	726.9	660.4	749.3	876.3		47.8	44.5	11.2
in.	28"	40.75	3.75	4.12	8.12	30.81	28	31.5	37	28	2	1 7/8	0.5
mm.		1035.1	95.3	104.6	206.2	782.6	711.2	800.1	939.8		50.8	47.6	12.7
in.	30"	43	4	4.38	8.62	32.94	30	33.75	39.25	28	2.12	2	0.5
mm.		1092.2	101.6	111.3	218.9	836.7	762	857.3	997		53.8	50.8	12.7
in.	32"	45.25	4.25	4.56	9.12	35	32	36	41.25	28	2.12	2	0.5
mm.		1149.4	108	115.8	231.6	889	812.8	914.4	1047.8		53.8	50.8	12.7
in.	34"	47.5	4.38	4.81	9.5	37.19	34	38	43.5	28	2.12	2	0.56
mm.		1206.5	111.3	122.2	241.3	944.6	863.6	965.2	1104.9		53.8	50.8	14.2
in.	36"	50	4.5	5.06	9.88	39.38	36	40.25	46	32	2.12	2	0.56
mm.		1270	114.3	128.5	251	1000.3	914.4	1022.4	1168.4		53.8	50.8	14.2
in.	38"	47.5	4.88	4.88	8.12	39.5	38	40.75	44	32	1.88	1 3/4	0.56
mm.		1206.5	124	124	206.2	1003.3	965.2	1035.1	1117.6		47.8	44.5	14.2
in.	40"	50	5.12	5.12	8.5	41.5	40	43	46.25	32	2	1 7/8	0.56
mm.		1270	130	130	215.9	1054.1	1016	1092.2	1174.8		50.8	47.6	14.2
in.	42"	52	5.25	5.25	8.81	43.62	42	45	48.25	32	2	1 7/8	0.56
mm.		1320.8	133.4	133.4	223.8	1107.9	1066.8	1143	1225.6		50.8	47.6	14.2
in.	44"	54.5	5.5	5.5	9.18	45.62	44	47.25	50.5	32	2.12	2	0.56
mm.		1384.3	139.7	139.7	233.2	1158.7	1117.6	1200.2	1282.7		53.8	50.8	14.2
in.	46"	56.75	5.75	5.75	9.62	47.75	46	49.5	52.75	36	2.12	2	0.56
mm.		1441.5	146.1	146.1	244.3	1212.9	1168.4	1257.3	1339.9		53.8	50.8	14.2
in.	48"	59.5	6	6	10.12	49.88	48	51.5	55.25	28	2.38	2 1/4	0.56
mm.		1511.3	152.4	152.4	257	1267	1219.2	1308.1	1403.4		60.5	57.2	14.2
in.	50"	61.75	6.19	6.25	10.56	52	50	53.62	57.5	32	2.38	2 1/4	0.56
mm.		1568.5	157.2	158.8	268.2	1320.8	1270	1361.9	1460.5		60.5	57.2	14.2
in.	52"	63.75	6.38	6.44	10.88	54	52	55.62	59.5	32	2.38	2 1/4	0.56
mm.		1619.3	162.1	163.6	276.4	1371.6	1320.8	1412.7	1511.3		60.5	57.2	14.2
in.	54"	67	6.69	6.75	11.38	56.12	54	57.88	62.25	28	2.62	2 1/2	0.56
mm.		1701.8	169.9	171.5	289.1	1425.4	1371.6	1470.2	1581.2		66.5	63.5	14.2
in.	56"	69	6.88	6.94	11.75	58.25	56	60.12	64.25	32	2.62	2 1/2	0.56
mm.		1752.6	174.8	176.3	298.5	1479.6	1422.4	1527	1632		66.5	63.5	14.2
in.	58"	71	7	7.12	12.06	60.25	58	62.12	66.25	32	2.62	2 1/2	0.56
mm.		1803.4	177.8	180.8	306.3	1530.4	1473.2	1577.8	1682.8		66.5	63.5	14.2
in.	60"	74.25	7.31	7.44	12.56	62.38	60	64.38	69	32	2.88	2 5/8	0.56
mm.		1886	185.7	189	319	1584.5	1524	1635.3	1752.6		73.2	66.7	14.2



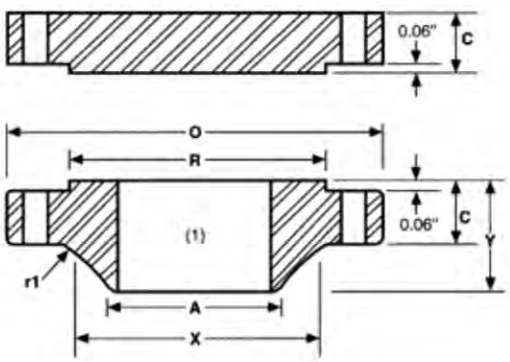
Class 600

Nom. Size		O	WNF	BLIND	Y	X	A	R	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	R1
in.	26"	40	4.25	4.94	8.75	29.44	26	29.5	36	28	2	1 7/8	0.5
mm.		1016	108	125.5	222.3	747.8	660.4	749.3	914.4		50.8	47.6	12.7
in.	28"	42.25	4.38	5.19	9.25	31.62	28	31.5	38	28	2.12	2	0.5
mm.		1073.2	111.3	131.8	235	803.1	711.2	800.1	965.2		53.8	50.8	12.7
in.	30"	44.5	4.5	5.5	9.75	33.94	30	33.75	40.25	28	2.12	2	0.5
mm.		1130.3	114.3	139.7	247.7	862.1	762	857.3	1022.4		53.8	50.8	12.7
in.	32"	47	4.62	5.81	10.25	36.12	32	36	42.5	28	2.38	2 1/4	0.5
mm.		1193.8	117.3	147.6	260.4	917.4	812.8	914.4	1079.5		60.5	57.2	12.7
in.	34"	49	4.75	6.06	10.62	38.31	34	38	44.5	28	2.38	2 1/4	0.56
mm.		1244.6	120.7	153.9	269.7	973.1	863.6	965.2	1130.3		60.5	57.2	14.2
in.	36"	51.75	4.88	6.38	11.12	40.62	36	40.25	47	28	2.62	2 1/2	0.56
mm.		1314.5	124	162.1	282.4	1031.7	914.4	1022.4	1193.8		66.5	63.5	14.2
in.	38"	50	6	6.12	10	40.25	38	41.5	45.75	28	2.38	2 1/4	0.56
mm.		1270	152.4	155.4	254	1022.4	965.2	1054.1	1162.1		60.5	57.2	14.2
in.	40"	52	6.25	6.38	10.38	42.25	40	43.75	47.75	32	2.38	2 1/4	0.56
mm.		1320.8	158.8	162.1	263.7	1073.2	1016	1111.3	1212.9		60.5	57.2	14.2
in.	42"	55.25	6.62	6.75	11	44.38	42	46	50.5	28	2.62	2 1/2	0.56
mm.		1403.4	168.1	171.5	279.4	1127.3	1066.8	1168.4	1282.7		66.5	63.5	14.2
in.	44"	57.25	6.81	7	11.38	46.5	44	48.25	52.5	32	2.62	2 1/2	0.56
mm.		1454.2	173	177.8	289.1	1181.1	1117.6	1225.6	1333.5		66.5	63.5	14.2
in.	46"	59.5	7.06	7.31	11.81	48.62	46	50.25	54.75	32	2.62	2 1/2	0.56
mm.		1511.3	179.3	185.7	300	1234.9	1168.4	1276.4	1390.7		66.5	63.5	14.2
in.	48"	62.75	7.44	7.69	12.44	50.75	48	52.5	57.5	32	2.88	2 3/4	0.56
mm.		1593.9	189	195.3	316	1289.1	1219.2	1333.5	1460.5		73.2	69.9	14.2
in.	50"	65.75	7.75	8	12.94	52.88	50	54.5	60	28	3.12	3	0.56
mm.		1670.1	196.9	203.2	328.7	1343.2	1270	1384.3	1524		79.2	76.2	14.2
in.	52"	67.75	8	8.25	13.25	54.88	52	56.5	62	32	3.12	3	0.56
mm.		1720.9	203.2	209.6	336.6	1394	1320.8	1435.1	1574.8		79.2	76.2	14.2
in.	54"	70	8.25	8.56	13.75	57	54	58.75	64.25	32	3.12	3	0.56
mm.		1778	209.6	217.4	349.3	1447.8	1371.6	1492.3	1632		79.2	76.2	14.2
in.	56"	73	8.56	8.88	14.25	59.12	56	60.75	66.75	32	3.38	3 1/4	0.62
mm.		1854.2	217.4	225.6	362	1501.6	1422.4	1543.1	1695.5		85.9	82.6	15.7
in.	58"	75	8.75	9.12	14.56	61.12	58	63	68.75	32	3.38	3 1/4	0.62
mm.		1905	222.3	231.6	369.8	1552.4	1473.2	1600.2	1746.3		85.9	82.6	15.7
in.	60"	78.5	9.19	9.56	15.31	63.38	60	65.25	71.75	28	3.62	3 1/2	0.69
mm.		1993.9	233.4	242.8	388.9	1609.9	1524	1657.4	1822.5		91.9	88.9	17.5



Class 900

Nom. Size		O	WNF	BLIND	Y	X	A	R	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	R1
in.	26"	42.75	5.5	6.31	11.25	30.5	26	29.5	37.5	20	2.88	2 3/4	0.44
mm.		1085.9	139.7	160.3	285.8	774.7	660.4	749.3	952.5		73.2	69.9	11.2
in.	28"	46	5.62	6.75	11.75	32.75	28	31.5	40.25	20	3.12	3	0.5
mm.		1168.4	142.7	171.5	298.5	831.9	711.2	800.1	1022.4		79.2	76.2	12.7
in.	30"	48.5	5.88	7.18	12.25	35	30	33.75	42.75	20	3.12	3	0.5
mm.		1231.9	149.4	182.4	311.2	889	762	857.3	1085.9		79.2	76.2	12.7
in.	32"	51.75	6.25	7.62	13	37.25	32	36	45.5	20	3.38	3 1/4	0.5
mm.		1314.5	158.8	193.5	330.2	946.2	812.8	914.4	1155.7		85.9	82.6	12.7
in.	34"	55	6.5	8.06	13.75	39.62	34	38	48.25	20	3.62	3 1/2	0.56
mm.		1397	165.1	204.7	349.3	1006.3	863.6	965.2	1225.6		91.9	88.9	14.2
in.	36"	57.5	6.75	8.44	14.25	41.88	36	40.25	50.75	20	3.62	3 1/2	0.56
mm.		1460.5	171.5	214.4	362	1063.8	914.4	1022.4	1289.1		91.9	88.9	14.2
in.	38"	57.5	7.5	8.5	13.88	42.25	38	43.25	50.75	20	3.62	3 1/2	0.75
mm.		1460.5	190.5	215.9	352.6	1073.2	965.2	1098.6	1289.1		91.9	88.9	19.1
in.	40"	59.5	7.75	8.81	14.31	44.38	40	45.75	52.75	24	3.62	3 1/2	0.81
mm.		1511.3	196.9	223.8	363.5	1127.3	1016	1162.1	1339.9		91.9	88.9	20.6
in.	42"	61.5	8.12	9.12	14.62	46.31	42	47.75	54.75	24	3.62	3 1/2	0.81
mm.		1562.1	206.2	231.6	371.3	1176.3	1066.8	1212.9	1390.7		91.9	88.9	20.6
in.	44"	64.88	8.44	9.56	15.38	48.62	44	50	57.62	24	3.88	3 3/4	0.88
mm.		1648	214.4	242.8	390.7	1234.9	1117.6	1270	1463.5		98.6	95.3	22.4
in.	46"	68.25	8.88	10.86	16.18	50.88	46	52.5	60.5	24	4.12	4	0.88
mm.		1733.6	225.6	275.8	411	1292.4	1168.4	1333.5	1536.7		104.6	101.6	22.4
in.	48"	70.25	9.19	10.38	16.5	52.88	48	54.5	62.5	24	4.12	4	0.94
mm.		1784.4	233.4	263.7	419.1	1343.2	1219.2	1384.3	1587.5		104.6	101.6	23.9



Class 75

Nom. Size		O	WNF	BLIND	Y	X	A	R.	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	R1
in.	26"	30	1.31	1.31	2.31	26.62	26.06	27.75	28.5	36	0.75	05/08/07	0.31
mm.		762	33.3	33.3	58.7	676.1	661.9	704.9	723.9		19.1	15.9	7.9
in.	28"	32	1.31	1.31	2.44	28.62	28.06	29.75	30.5	40	0.75	05/08/07	0.31
mm.		812.8	33.3	33.3	62	726.9	712.7	755.7	774.7		19.1	15.9	7.9
in.	30"	34	1.31	1.31	2.56	30.62	30.06	31.75	32.5	44	0.75	05/08/07	0.31
mm.		863.6	33.3	33.3	65	777.7	763.5	806.5	825.5		19.1	15.9	7.9
in.	32"	36	1.38	1.38	2.75	32.62	32.06	33.75	34.5	48	0.75	05/08/07	0.31
mm.		914.4	35.1	35.1	69.9	828.5	814.3	857.3	876.3		19.1	15.9	7.9
in.	34"	38	1.38	1.38	2.88	34.62	34.06	35.75	36.5	52	0.75	05/08/07	0.31
mm.		965.2	35.1	35.1	73.2	879.3	865.1	908.1	927.1		19.1	15.9	7.9
in.	36"	40.69	1.44	1.44	2.38	36.81	36.06	38	39.06	40	0.88	03/04/07	0.38
mm.		1033.5	36.6	36.6	60.5	935	915.9	965.2	992.1		22.4	19.1	9.7
in.	38"	42.69	1.5	1.5	3.5	38.81	38.06	40	41.06	40	0.88	03/04/07	0.38
mm.		1084.3	38.1	38.1	88.9	985.8	966.7	1016	1042.9		22.4	19.1	9.7
in.	40"	44.69	1.5	1.5	3.62	40.81	40.06	42	43.06	44	0.88	03/04/07	0.38
mm.		1135.1	38.1	38.1	91.9	1036.6	1017.5	1066.8	1093.7		22.4	19.1	9.7
in.	42"	46.69	1.56	1.56	3.75	42.81	42.06	44	45.06	48	0.88	03/04/07	0.38
mm.		1185.9	39.6	39.6	95.3	1087.4	1068.3	1117.6	1144.5		22.4	19.1	9.7
in.	44"	49.25	1.69	1.69	4.12	44.88	44.06	46.25	47.38	36	1	07/08/07	0.38
mm.		1251	42.9	42.9	104.6	1140	1119.1	1174.8	1203.5		25.4	22.2	9.7
in.	46"	51.25	1.75	1.75	4.25	46.88	46.06	48.25	49.38	40	1	07/08/07	0.38
mm.		1301.8	44.5	44.5	108	1190.8	1169.9	1225.6	1254.3		25.4	22.2	9.7
in.	48"	53.25	1.81	1.81	4.38	48.88	48.06	50.25	51.38	44	1	07/08/07	0.38
mm.		1352.6	46	46	111.3	1241.6	1220.7	1276.4	1305.1		25.4	22.2	9.7
in.	50"	55.25	1.88	1.88	4.56	50.94	50.06	52.25	53.38	44	1	07/08/07	0.38
mm.		1403.4	47.8	47.8	115.8	1293.9	1271.5	1327.2	1355.9		25.4	22.2	9.7

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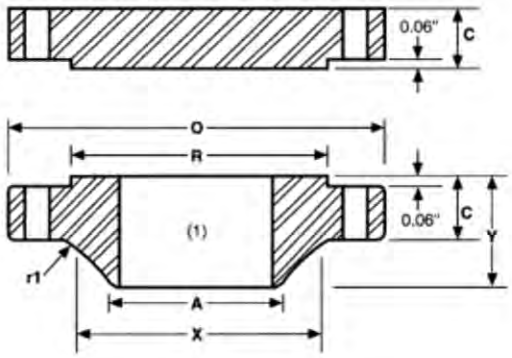
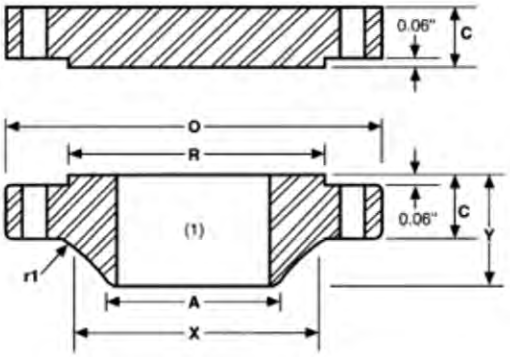
Class 75 continued

in.	52"	57.38	1.88	1.88	4.75	52.94	52.06	54.25	55.5	48	1	07/08/07	0.38
mm.		1457.5	47.8	47.8	120.7	1344.7	1322.3	1378	1409.7		25.4	22.2	9.7
in.	54"	59.38	1.94	1.94	4.94	55	54.06	56.25	57.5	48	1	07/08/07	0.38
mm.		1508.3	49.3	49.3	125.5	1397	1373.1	1428.8	1460.5		25.4	22.2	9.7
in.	56"	62	2	2	5.31	57.12	56.06	58.25	59.88	40	1.12	1	0.44
mm.		1574.8	50.8	50.8	134.9	1450.8	1423.9	1479.6	1521		28.4	25.4	11.2
in.	58"	64	2.06	2.06	5.44	59.12	58.06	60.5	61.88	44	1.12	1	0.44
mm.		1625.6	52.3	52.3	138.2	1501.6	1474.7	1536.7	1571.8		28.4	25.4	11.2
in.	60"	66	2.19	2.19	5.69	61.12	60.06	62.5	63.88	44	1.12	1	0.44
mm.		1676.4	55.6	55.6	144.5	1552.4	1525.5	1587.5	1622.6		28.4	25.4	11.2



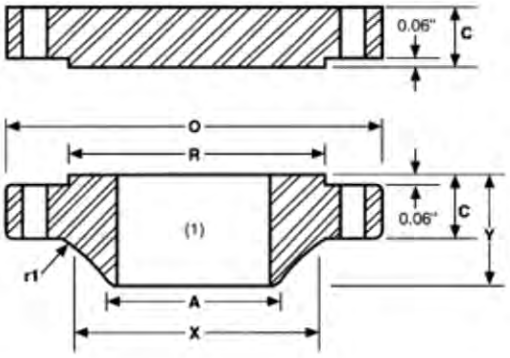
Class 150

Nom. Size		Outside diam. of flange	Thick. of flange	Length through hub	Diam. of hub	Hub diam. top	Raised face diam.	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	Fillet radius min.
In.	26"	30.94	1.62	3.5	26.94	26.06	28	29.31	36	0.88	03/04/07	0.38
mm.		785.9	41.1	88.9	684.3	661.9	711.2	744.5		22.4	19.1	9.7
in.	28"	32.94	1.75	3.75	28.94	28.06	30	31.31	40	0.88	03/04/07	0.38
mm.		836.7	44.5	95.3	735.1	712.7	762	795.3		22.4	19.1	9.7
in.	30"	34.94	1.75	3.94	31	30.06	32	33.31	44	0.88	03/04/07	0.38
mm.		887.5	44.5	100.1	787.4	763.5	812.8	846.1		22.4	19.1	9.7
in.	32"	37.06	1.81	4.25	33.06	32.06	34	35.44	48	0.88	03/04/07	0.38
mm.		941.3	46	108	839.7	814.3	863.6	900.2		22.4	19.1	9.7
in.	34"	39.56	1.94	4.34	35.12	34.06	36.25	37.69	40	1	07/08/07	0.38
mm.		1004.8	49.3	110.2	892	865.1	920.8	957.3		25.4	22.2	9.7
in.	36"	41.62	2.06	4.62	37.19	36.06	38.25	39.75	44	1	07/08/07	0.38
mm.		1057.1	52.3	117.3	944.6	915.9	971.6	1009.7		25.4	22.2	9.7
in.	38"	44.25	2.12	4.88	39.12	38.12	40.25	42.12	40	1.12	1	0.38
mm.		1124	53.8	124	993.6	968.2	1022.4	1069.8		28.4	25.4	9.7
in.	40"	46.25	2.19	5.06	41.31	40.12	42.5	44.12	44	1.12	1	0.38
mm.		1174.8	55.6	128.5	1049.3	1019	1079.5	1120.6		28.4	25.4	9.7
in.	42"	48.25	2.31	5.25	43.38	42.12	44.5	46.12	48	1.12	1	0.44
mm.		1225.6	58.7	133.4	1101.9	1069.8	1130.3	1171.4		28.4	25.4	11.2
in.	44"	50.25	2.38	5.38	45.38	44.12	46.5	48.12	52	1.12	1	0.44
mm.		1276.4	60.5	136.7	1152.7	1120.6	1181.1	1222.2		28.4	25.4	11.2
in.	46"	52.81	2.44	5.69	47.44	46.12	48.62	50.56	40	1.25	1 1/8	0.44
mm.		1341.4	62	144.5	1205	1171.4	1234.9	1284.2		31.8	28.6	11.2
in.	48"	54.81	2.56	5.88	49.5	48.12	50.75	52.56	44	1.25	1 1/8	0.44
mm.		1392.2	65	149.4	1257.3	1222.2	1289.1	1335		31.8	28.6	11.2
in.	50"	56.81	2.69	6.06	51.5	50.12	52.75	54.56	48	1.25	1 1/8	0.44
mm.		1443	68.3	153.9	1308.1	1273	1339.9	1385.8		31.8	28.6	11.2
in.	52"	58.81	2.75	6.19	53.56	52.12	54.75	56.56	52	1.25	1 1/8	0.44
mm.		1493.8	69.9	157.2	1360.4	1323.8	1390.7	1436.6		31.8	28.6	11.2
in.	54"	61	2.81	6.38	55.62	54.12	56.75	58.75	56	1.25	1 1/8	0.44
mm.		1549.4	71.4	162.1	1412.7	1374.6	1441.5	1492.3		31.8	28.6	11.2
in.	56"	63	2.88	6.56	57.69	56.12	58.75	60.75	60	1.25	1 1/8	0.56
mm.		1600.2	73.2	166.6	1465.3	1425.4	1492.3	1543.1		31.8	28.6	14.2
in.	58"	65.94	2.94	6.88	59.69	58.12	60.75	63.44	48	1.38	1 1/4	0.56
mm.		1674.9	74.7	174.8	1516.1	1476.2	1543.1	1611.4		35.1	31.8	14.2
in.	60"	67.94	3	7.06	61.81	60.12	63	65.44	52	1.38	1 1/4	0.56
mm.		1725.7	76.2	179.3	1570	1527	1600.2	1662.2		35.1	31.8	14.2



Class 300

Nom. Size		Outside diam. of flange	Thick. of flange	Length through hub	Diam. of hub	Hub diam. top	Raised face diam.	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	Fillet radius min.
in.	26"	34.12	3.5	5.69	27.62	26.19	29	31.62	32	1.38	1 1/4	0.56
mm.		866.6	88.9	144.5	701.5	665.2	736.6	803.1		35.1	31.8	14.2
in.	28"	36.25	3.5	5.88	29.75	28.19	31	33.75	36	1.38	1 1/4	0.56
mm.		920.8	88.9	149.4	755.7	716	787.4	857.3		35.1	31.8	14.2
in.	30"	39	3.69	6.22	32	30.25	33.25	36.25	36	1.5	1 3/8	0.56
mm.		990.6	93.7	158	812.8	768.4	844.6	920.8		38.1	34.9	14.2
in.	32"	41.5	4.06	6.62	34	32.25	35.5	38.5	32	1.62	1 1/2	0.62
mm.		1054.1	103.1	168.1	863.6	819.2	901.7	977.9		41.1	38.1	15.7
in.	34"	43.62	4.06	6.81	36.12	34.25	37.5	40.62	36	1.62	1 1/2	0.62
mm.		1107.9	103.1	173	917.4	870	952.5	1031.7		41.1	38.1	15.7
in.	36"	46.12	4.06	7.12	38	36.25	39.75	42.88	32	1.75	1 5/8	0.62
mm.		1171.4	103.1	180.8	965.2	920.8	1009.7	1089.2		44.5	41.3	15.7
in.	38"	48.12	4.38	7.56	40	38.25	41.75	44.88	36	1.75	1 5/8	0.62
mm.		1222.2	111.3	192	1016	971.6	1060.5	1140		44.5	41.3	15.7
in.	40"	50.12	4.56	7.81	42	40.25	43.88	46.88	40	1.75	1 5/8	0.62
mm.		1273	115.8	198.4	1066.8	1022.4	1114.6	1190.8		44.5	41.3	15.7
in.	42"	52.5	4.69	8.06	44	42.31	46	49	36	1.88	1 3/4	0.62
mm.		1333.5	119.1	204.7	1117.6	1074.7	1168.4	1244.6		47.8	44.5	15.7
in.	44"	54.5	5	8.44	46.19	44.31	48	51	40	1.88	1 3/4	0.62
mm.		1384.3	127	214.4	1173.2	1125.5	1219.2	1295.4		47.8	44.5	15.7
in.	46"	57.5	5.06	8.75	48.38	46.31	50	53.75	36	2	1 7/8	0.62
mm.		1460.5	128.5	222.3	1228.9	1176.3	1270	1365.3		50.8	47.6	15.7
in.	48"	59.5	5.06	8.81	50.31	48.31	52.25	55.75	40	2	1 7/8	0.62
mm.		1511.3	128.5	223.8	1277.9	1227.1	1327.2	1416.1		50.8	47.6	15.7
in.	50"	61.5	5.44	9.25	52.38	50.31	54.25	57.75	44	2	1 7/8	0.62
mm.		1562.1	138.2	235	1330.5	1277.9	1378	1466.9		50.8	47.6	15.7
in.	52"	63.5	5.62	9.56	54.44	52.31	56.25	59.75	48	2	1 7/8	0.62
mm.		1612.9	142.7	242.8	1382.8	1328.7	1428.8	1517.7		50.8	47.6	15.7
in.	54"	65.88	5.38	9.44	56.5	54.31	58.25	62.12	48	2	1 7/8	0.62
mm.		1673.4	136.7	239.8	1435.1	1379.5	1479.6	1577.8		50.8	47.6	15.7
in.	56"	69.5	6.06	10.56	58.81	56.31	60.5	65	36	2.38	2 1/4	0.69
mm.		1765.3	153.9	268.2	1493.8	1430.3	1536.7	1651		60.5	57.2	17.5
in.	58"	71.94	6.06	10.81	60.94	58.31	62.75	67.44	40	2.38	2 1/4	0.69
mm.		1827.3	153.9	274.6	1547.9	1481.1	1593.9	1713		60.5	57.2	17.5
in.	60"	73.94	5.94	10.69	62.94	60.31	65	69.44	40	2.38	2 1/4	0.69
mm.		1878.1	150.9	271.5	1598.7	1531.9	1651	1763.8		60.5	57.2	17.5

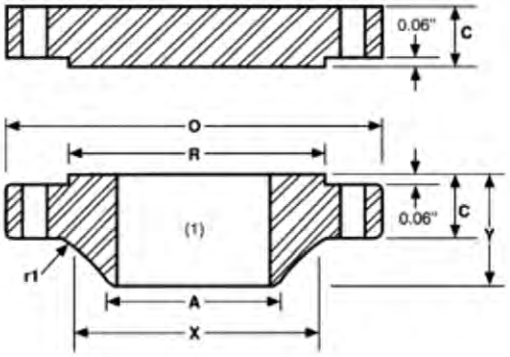


Class 400

Nom. Size		Outside diam. of flange	Thick. of flange	Length through hub	Diam. of hub	Hub diam. top	Raised face diam.	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	Fillet radius min.
in.	26"	33.5	3.5	5.88	27.12	26	28	30.75	28	1.5	1 3/8	0.44
mm.		850.9	88.9	149.4	688.8	660.4	711.2	781.1		38.1	34.9	11.2
in.	28"	36	3.75	6.25	29.12	28	30	33	24	1.62	1 1/2	0.5
mm.		914.4	95.3	158.8	739.6	711.2	762	838.2		41.1	38.1	12.7
in.	30"	38.25	4	6.69	31.25	30	32.25	35.25	28	1.62	1 1/2	0.5
mm.		971.6	101.6	169.9	793.8	762	819.2	895.4		41.1	38.1	12.7
in.	32"	40.75	4.25	7.06	33.25	32	34.38	37.5	28	1.75	1 5/8	0.5
mm.		1035.1	108	179.3	844.6	812.8	873.3	952.5		44.5	41.3	12.7
in.	34"	42.75	4.38	7.38	35.38	34	36.5	39.5	32	1.75	1 5/8	0.56
mm.		1085.9	111.3	187.5	898.7	863.6	927.1	1003.3		44.5	41.3	14.2
in.	36"	45.5	4.69	7.88	37.5	36	38.62	42	28	1.88	1 3/4	0.56
mm.		1155.7	119.1	200.2	952.5	914.4	980.9	1066.8		47.8	44.5	14.2

Class 600

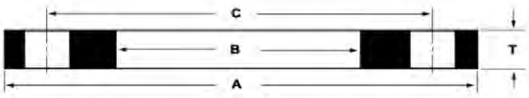
Nom. Size		Outside diam. of flange	Thick. of flange	Length through hub	Diam. of hub	Hub diam. top	Raised face diam.	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	Fillet radius min.
in.	26"	35	4.38	7.12	27.5	26	28.62	31.75	28	1.75	1 5/8	0.5
mm.		889	111.3	180.8	698.5	660.4	726.9	806.5		44.5	41.3	12.7
in.	28"	37.5	4.56	7.5	29.62	28	30.88	34	28	1.88	1 3/4	0.5
mm.		952.5	115.8	190.5	752.3	711.2	784.4	863.6		47.8	44.5	12.7
in.	30"	40.25	4.94	8.06	31.75	30	33.12	36.5	28	2	1 7/8	0.5
mm.		1022.4	125.5	204.7	806.5	762	841.2	927.1		50.8	47.6	12.7
in.	32"	42.75	5.12	8.5	33.88	32	35.25	38.75	28	2.12	2	0.5
mm.		1085.9	130	215.9	860.6	812.8	895.4	984.3		53.8	50.8	12.7
in.	34"	45.75	5.56	9.19	36	34	37.5	41.5	24	2.38	2 1/4	0.56
mm.		1162.1	141.2	233.4	914.4	863.6	952.5	1054.1		60.5	57.2	14.2
in.	36"	47.75	5.76	9.56	38.12	36	39.75	43.5	28	2.38	2 1/4	0.56
mm.		1212.9	146.3	242.8	968.2	914.4	1009.7	1104.9		60.5	57.2	14.2



Class 900

Nom. Size		Outside diam. of flange	Thick. of flange	Length through hub	Diam. of hub	Hub diam. top	Raised face diam.	Diam. of bolt circle	No. of holes	Diam. of bolt hole	Diam. of bolt	Fillet radius min.
in.	26"	40.25	5.31	10.19	29.25	26	30	35.5	20	2.62	2 1/2	0.44
mm.		1022.4	134.9	258.8	743	660.4	762	901.7		66.5	63.5	11.2
in.	28"	43.5	5.81	10.88	31.38	28	32.25	38.25	20	2.88	2 3/4	0.5
mm.		1104.9	147.6	276.4	797.1	711.2	819.2	971.6		73.2	69.9	12.7
in.	30"	46.5	6.12	11.38	33.5	30	34.5	40.75	20	3.12	3	0.5
mm.		1181.1	155.4	289.1	850.9	762	876.3	1035.1		79.2	76.2	12.7
in.	32"	48.75	6.31	11.94	35.75	32	36.5	43	20	3.12	3	0.5
mm.		1238.3	160.3	303.3	908.1	812.8	927.1	1092.2		79.2	76.2	12.7
in.	34"	51.75	6.75	12.56	37.88	34	39	45.5	20	3.38	3 1/4	0.56
mm.		1314.5	171.5	319	962.2	863.6	990.6	1155.7		85.9	82.6	14.2
in.	36"	53	6.81	12.81	40	36	40.5	47.25	24	3.12	3	0.56
mm.		1346.2	173	325.4	1016	914.4	1028.7	1200.2		79.2	76.2	14.2

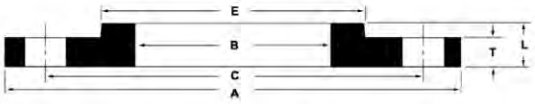
AWWA C207-07 Class B Ring



- All dimensions are in inches.
- Pressure rating at atmospheric temperature is 86 psi.

Nom. Size	Outside Diam. (A)	Thickness (T)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9.00	0.625	4.57	8	8	0.750	7.50
5	10.00	0.625	5.66	9	8	0.875	8.50
6	11.00	0.688	6.72	11	8	0.875	9.50
8	13.50	0.688	8.72	16	8	0.875	11.75
10	16.00	0.688	10.88	20	12	1.000	14.25
12	19.00	0.688	12.88	30	12	1.000	17.00
14	21.00	0.688	14.19	36	12	1.125	18.75
16	23.50	0.688	16.19	43	16	1.125	21.25
18	25.00	0.688	18.19	43	16	1.250	22.75
20	27.50	0.688	20.19	51	20	1.250	25.00
22	29.50	0.750	22.19	60	20	1.375	27.25
24	32.00	0.750	24.19	70	20	1.375	29.50
26	34.25	0.812	26.19	84	24	1.375	31.75
28	36.50	0.875	28.19	99	28	1.375	34.00
30	38.75	0.875	30.19	110	28	1.375	36.00
32	41.75	0.938	32.19	139	28	1.625	38.50
34	43.75	0.938	34.19	149	32	1.625	40.50
36	46.00	1.000	36.19	169	32	1.625	42.75
38	48.75	1.000	38.19	195	32	1.625	45.25
40	50.75	1.000	40.19	203	36	1.625	47.25
42	53.00	1.125	42.19	246	36	1.625	49.50
44	55.25	1.125	44.19	262	40	1.625	51.75
46	57.25	1.125	46.19	274	40	1.625	53.75
48	59.50	1.250	48.19	323	44	1.625	56.00
50	61.75	1.250	50.19	334	44	1.875	58.25
52	64.00	1.250	52.19	356	44	1.875	60.50
54	66.25	1.375	54.19	418	44	1.875	62.75
60	73.00	1.500	60.19	535	52	1.875	69.25
66	80.00	1.625	66.19	699	52	1.875	76.00
72	86.50	1.750	72.19	844	60	1.875	82.50
78	93.00	2.000	78.19	1052	64	2.125	89.00
84	99.75	2.000	84.19	1205	64	2.125	95.50
90	106.50	2.250	90.19	1478	68	2.438	102.00
96	113.25	2.250	96.19	1670	68	2.438	108.50
102	120.00	2.500	102.19	2013	72	2.688	114.50
108	126.75	2.500	108.19	2249	72	2.688	120.75
114	133.50	2.750	114.19	2658	76	2.938	126.75
120	140.25	2.750	120.19	2943	76	2.938	132.75
126	147.00	3.000	126.19	3423	80	3.188	139.25
132	153.75	3.000	132.19	3761	80	3.188	145.75
138	160.50	3.250	138.19	4317	84	3.438	152.00
144	167.25	3.250	144.19	4711	84	3.438	158.25

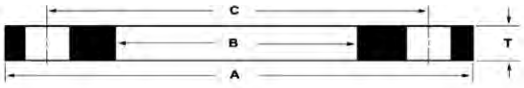
AWWA C207-94 Class B Hub



- All dimensions are in inches.
- Pressure rating at atmospheric temperature is 175 psi for sizes 12" and under and 150 psi for sizes 14" and up.

Nom. Size	Outside Diam. (A)	Thickness (T)	Overall Thickness (L)	Hub Diam. (E)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9.00	0.500	0.875	5.312	4.57	7	8	0.750	7.50
5	10.00	0.562	1.250	6.312	5.66	8	8	0.875	8.50
6	11.00	0.562	1.250	7.562	6.72	13	8	0.875	9.50
8	13.50	0.562	1.250	9.688	8.72	18	8	0.875	11.75
10	16.00	0.688	1.250	12.000	10.88	26	12	1.000	14.25
12	19.00	0.688	1.250	14.375	12.88	42	12	1.000	17.00
14	21.00	0.750	1.250	15.750	14.19	44	12	1.125	18.75
16	23.50	0.750	1.250	18.000	16.19	58	16	1.125	21.25
18	25.00	0.750	1.250	19.875	18.19	59	16	1.250	22.75
20	27.50	0.750	1.250	22.000	20.19	69	20	1.250	25.00
22	29.50	1.000	1.750	24.250	22.19	76	20	1.375	27.25
24	32.00	1.000	1.750	26.125	24.19	115	20	1.375	29.50
26	34.25	1.000	1.750	28.500	26.19	125	24	1.375	31.75
28	36.50	1.000	1.750	30.500	28.19	140	28	1.375	34.00
30	38.75	1.000	1.750	32.500	30.19	150	28	1.375	36.00
32	41.75	1.125	1.750	34.750	32.19	205	28	1.625	38.50
34	43.75	1.125	1.750	36.750	34.19	215	32	1.625	40.50
36	46.00	1.125	1.750	38.750	36.19	235	32	1.625	42.75
38	48.75	1.125	1.750	40.750	38.19	265	32	1.625	45.25
40	50.75	1.125	1.750	43.000	40.19	280	36	1.625	47.25
42	53.00	1.250	1.750	45.000	42.19	330	36	1.625	49.50
44	55.25	1.250	2.250	47.000	44.19	350	40	1.625	51.75
46	57.25	1.250	2.250	49.000	46.19	365	40	1.625	53.75
48	59.50	1.375	2.500	51.000	48.19	425	44	1.625	56.00
50	61.75	1.375	2.500	53.000	50.19	450	44	1.875	58.25
52	64.00	1.375	2.500	55.000	52.19	475	44	1.875	60.50
54	66.25	1.375	2.500	57.000	54.19	500	44	1.875	62.75
60	73.00	1.500	2.750	63.000	60.19	640	52	1.875	69.25
66	80.00	1.500	2.750	69.000	66.19	750	52	1.875	76.00
72	86.50	1.500	2.750	75.000	72.19	850	60	1.875	82.50
78	93.00	1.750	3.000	81.250	78.19	1200	64	2.125	89.00
84	99.75	1.750	3.000	87.500	84.19	1250	64	2.125	95.50
90	106.50	2.000	3.250	93.750	90.19	1650	68	2.438	102.00
96	113.25	2.000	3.250	100.000	96.19	1750	68	2.438	108.50

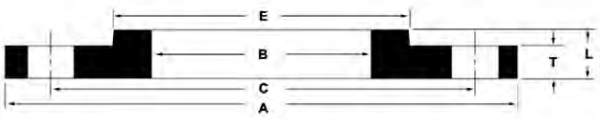
AWWA C207-07 Class D Ring



- All dimensions are in inches.
- Pressure rating at atmospheric temperature is 175 psi for sizes 12" and under and 150 psi for sizes 14" and up.

Nom. Size	Outside Diam. (A)	Thickness (T)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	0.625	4.57	8	8	0.75	7.50
5	10	0.625	5.66	9	8	0.875	8.50
6	11	0.688	6.72	11	8	0.875	9.50
8	13.5	0.688	8.72	15	8	0.875	11.75
10	16	0.688	10.88	19	12	1	14.25
12	19	0.812	12.88	33	12	1	17.00
14	21	0.938	14.19	47	12	1.125	18.75
16	23.5	1	16.19	60	16	1.125	21.25
18	25	1.062	18.19	68	16	1.25	22.75
20	27.5	1.125	20.19	79	20	1.25	25.00
22	29.5	1.188	22.19	90	20	1.375	27.25
24	32	1.25	24.19	112	20	1.375	29.50
26	34.25	1.312	26.19	129	24	1.375	31.75
28	36.5	1.312	28.19	141	28	1.375	34.00
30	38.75	1.375	30.19	172	28	1.375	36.00
32	41.75	1.5	32.19	211	28	1.625	38.50
34	43.75	1.5	34.19	220	32	1.625	40.50
36	46	1.625	36.19	261	32	1.625	42.75
38	48.75	1.625	38.19	301	32	1.625	45.25
40	50.75	1.625	40.19	313	36	1.625	47.25
42	53	1.75	42.19	364	36	1.625	49.50
44	55.25	1.75	44.19	387	40	1.625	51.75
46	57.25	1.75	46.19	404	40	1.625	53.75
48	59.5	1.875	48.19	460	44	1.625	56.00
50	61.75	2	50.19	507	44	1.875	58.25
52	64	2	52.19	542	44	1.875	60.50
54	66.25	2.125	54.19	614	44	1.875	62.75
60	73	2.25	60.19	763	52	1.875	69.25
66	80	2.5	66.19	1021	52	1.875	76.00
72	86.5	2.625	72.19	1203	60	1.875	82.50
78	93	2.75	78.19	1374	64	2.125	89.00
84	99.75	2.875	84.19	1646	64	2.125	95.50
90	106.5	3	90.19	1872	68	2.438	102.00
96	113.25	3.25	96.19	2292	68	2.438	108.50
102	120	3.25	102.2	2486	72	2.688	114.50
108	126.75	3.375	108.2	2884	72	2.688	120.75
114	133.5	3.5	114.2	3214	76	2.938	126.75
120	140.25	3.5	120.2	3558	76	2.938	132.75
126	147	3.75	126.2	4065	80	3.188	139.25
132	153.75	3.875	132.2	4614	80	3.188	145.75
138	160.5	4	138.2	5047	84	3.438	152.00
144	167.25	4.125	144.2	5681	84	3.438	158.25

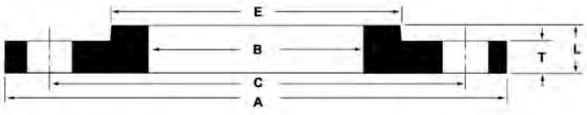
AWWA C207-07 Class D Hub



- All dimensions are in inches.
- The pressure rating at atmospheric temperature is 175 psi for 6" - 12" and 150 psi for 14" - 96".

Nom. Size	Outside Diam. (A)	Thickness (T)	Overall Thickness (L)	Hub Diam. (E)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	0.5	0.875	5.312	4.57	7	8	0.750	7.50
5	10	0.562	1.25	6.312	5.66	8	8	0.875	8.50
6	11	0.562	1.25	7.562	6.72	13	8	0.875	9.50
8	13.5	0.562	1.25	9.688	8.72	18	8	0.875	11.75
10	16	0.688	1.25	12.000	10.88	26	12	1.000	14.25
12	19	0.688	1.25	14.375	12.88	42	12	1.000	17.00
14	21	0.75	1.25	15.750	14.19	44	12	1.125	18.75
16	23.5	0.75	1.25	18.000	16.19	58	16	1.125	21.25
18	25	0.75	1.25	19.875	18.19	59	16	1.250	22.75
20	27.5	0.75	1.25	22.000	20.19	69	20	1.250	25.00
22	29.5	1	1.75	24.250	22.19	76	20	1.375	27.25
24	32	1	1.75	26.125	24.19	115	20	1.375	29.50
26	34.25	1	1.75	28.500	26.19	125	24	1.375	31.75
28	36.5	1	1.75	30.500	28.19	140	28	1.375	34.00
30	38.75	1	1.75	32.500	30.19	150	28	1.375	36.00
32	41.75	1.125	1.75	34.750	32.19	205	28	1.625	38.50
34	43.75	1.125	1.75	36.750	34.19	215	32	1.625	40.50
36	46	1.125	1.75	38.750	36.19	235	32	1.625	42.75
38	48.75	1.125	1.75	40.750	38.19	265	32	1.625	45.25
40	50.75	1.125	1.75	43.000	40.19	280	36	1.625	47.25
42	53	1.25	1.75	45.000	42.19	330	36	1.625	49.50
44	55.25	1.25	2.25	47.000	44.19	350	40	1.625	51.75
46	57.25	1.25	2.25	49.000	46.19	365	40	1.625	53.75
48	59.5	1.375	2.5	51.000	48.19	425	44	1.625	56.00
50	61.75	1.375	2.5	53.000	50.19	450	44	1.875	58.25
52	64	1.375	2.5	55.000	52.19	475	44	1.875	60.50
54	66.25	1.375	2.5	57.000	54.19	500	44	1.875	62.75
60	73	1.5	2.75	63.000	60.19	640	52	1.875	69.25
66	80	1.5	2.75	69.000	66.19	750	52	1.875	76.00
72	86.5	1.5	2.75	75.000	72.19	850	60	1.875	82.50
78	93	1.75	3	81.250	78.19	1200	64	2.125	89.00
84	99.75	1.75	3	87.500	84.19	1250	64	2.125	95.50
90	106.5	2	3.25	93.750	90.19	1650	68	2.438	102.00
96	113.25	2	3.25	100.000	96.19	1750	68	2.438	108.50

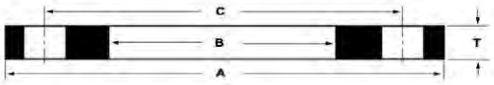
AWWA C207-07 Class E Hub



- All dimensions are in inches.
- Pressure rating at atmospheric temperature is 275 psi.

Nom. Size	Outside Diam. (A)	Thickness (T)	Overall Thickness (L)	Hub Diam. (E)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	0.938	1.312	5.312	4.57	13	8	0.750	7.50
5	10	0.938	1.438	6.438	5.66	15	8	0.875	8.50
6	11	1	1.562	7.562	6.72	19	8	0.875	9.50
8	13.5	1.125	1.75	9.688	8.72	30	8	0.875	11.75
10	16	1.188	1.938	12.000	10.88	43	12	1.000	14.25
12	19	1.25	2.188	14.375	12.88	64	12	1.000	17.00
14	21	1.375	2.25	15.750	14.19	85	12	1.125	18.75
16	23.5	1.438	2.5	18.000	16.19	98	16	1.125	21.25
18	25	1.562	2.688	19.875	18.19	120	16	1.250	22.75
20	27.5	1.688	2.875	22.000	20.19	155	20	1.250	25.00
22	29.5	1.812	3.125	24.000	22.19	190	20	1.375	27.25
24	32	1.875	3.25	26.125	24.19	210	20	1.375	29.50
26	34.25	2	3.375	28.500	26.19	235	24	1.375	31.75
28	36.5	2.062	3.438	30.750	28.19	270	28	1.375	34.00
30	38.75	2.125	3.5	32.750	30.19	305	28	1.375	36.00
32	41.75	2.25	3.625	35.000	32.19	375	28	1.625	38.50
34	43.75	2.312	3.688	37.000	34.19	400	32	1.625	40.50
36	46	2.375	3.75	39.250	36.19	450	32	1.625	42.75
38	48.75	2.375	3.75	41.750	38.19	530	32	1.625	45.25
40	50.75	2.5	3.875	43.750	40.19	570	36	1.625	47.25
42	53	2.625	4	46.000	42.19	650	36	1.625	49.50
44	55.25	2.625	4	48.000	44.19	690	40	1.625	51.75
46	57.25	2.688	4.062	50.000	46.19	730	40	1.625	53.75
48	59.5	2.75	4.125	52.250	48.19	800	44	1.625	56.00
50	61.75	2.75	4.125	54.250	50.19	830	44	1.875	58.25
52	64	2.875	4.25	56.500	52.19	920	44	1.875	60.50
54	66.25	3	4.375	58.750	54.19	1025	44	1.875	62.75
60	73	3.125	4.5	65.250	60.19	1250	52	1.875	69.25
66	80	3.375	4.875	71.500	66.19	1625	52	1.875	76.00
72	86.5	3.5	5	78.500	72.19	1925	60	1.875	82.50
78	93	3.875	5.375	84.500	78.19	2525	64	2.125	89.00
84	99.75	3.875	5.375	90.500	84.19	2600	64	2.125	95.50
90	106.5	4.25	5.75	96.750	90.19	3150	68	2.438	102.00
96	113.25	4.25	5.75	102.750	96.19	3275	68	2.438	108.50

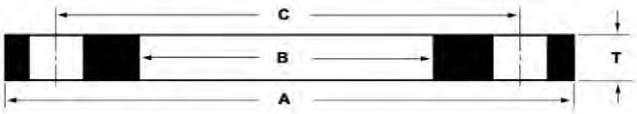
AWWA C207-07 Class E Ring



- All dimensions are in inches.
- Pressure rating at atmospheric temperature is 175 psi for sizes 12" and under and 150 psi for sizes 14" and up.

Nom. Size	Outside Diam. (A)	Thickness (T)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	1.125	4.57	14	8	0.75	7.5
5	10	1.188	5.66	16	8	0.875	8.5
6	11	1.313	6.72	22	8	0.875	9.5
8	13.5	1.5	8.72	33	8	0.875	11.75
10	16	1.563	10.88	47	12	1	14.25
12	19	1.75	12.88	71	12	1	17
14	21	1.875	14.19	94	12	1.125	18.75
16	23.5	2	16.19	120	16	1.125	21.25
18	25	2.125	18.19	127	16	1.25	22.75
20	27.5	2.375	20.19	168	20	1.25	25
22	29.5	2.5	22.19	189	20	1.375	27.25
24	32	2.625	24.19	234	20	1.375	29.5
26	34.25	2.75	26.19	270	24	1.375	31.75
28	36.5	2.75	28.19	297	28	1.375	34
30	38.75	2.875	30.19	344	28	1.375	36
32	41.75	3	32.19	422	28	1.625	38.5
34	43.75	3	34.19	460	32	1.625	40.5
36	46	3.125	36.19	502	32	1.625	42.75
38	48.75	3.125	38.19	580	32	1.625	45.25
40	50.75	3.25	40.19	626	36	1.625	47.25
42	53	3.375	42.19	701	36	1.625	49.5
44	55.25	3.375	44.19	747	40	1.625	51.75
46	57.25	3.438	46.19	794	40	1.625	53.75
48	59.5	3.5	48.19	858	44	1.625	56
50	61.75	3.5	50.19	887	44	1.875	58.25
52	64	3.625	52.19	982	44	1.875	60.5
54	66.25	3.75	54.19	1083	44	1.875	62.75
60	73	3.875	60.19	1313	52	1.875	69.25
66	80	4.25	66.19	1736	52	1.875	76
72	86.5	4.375	72.19	2005	60	1.875	82.5
78	93	4.75	78.19	2374	64	2.125	89
84	99.75	4.75	84.19	2719	64	2.125	95.5
90	106.5	5.125	90.19	3197	68	2.438	102
96	113.25	5.125	96.19	3614	68	2.438	108.5
102	120	5.5	102.2	4206	72	2.688	114.5
108	126.75	5.5	108.2	4700	72	2.688	120.75
114	133.5	5.875	114.2	5395	76	2.938	126.75
120	140.25	5.875	120.2	5972	76	2.938	132.75
126	147	6.25	126.2	6776	80	3.188	139.25
132	153.75	6.25	132.2	7443	80	3.188	145.75
138	160.5	6.75	138.2	8517	84	3.438	152
144	167.25	6.75	144.2	9295	84	3.438	158.25

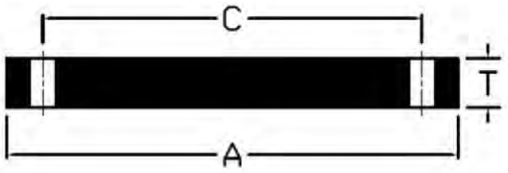
AWWA C207-07 Class F Ring



- All dimensions are in inches.
- Pressure rating at atmospheric temperature is 300 psi.

Nom. Size	Outside Diam. (A)	Thickness (T)	Inside Diam. (B)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	10	1.13	4.57	18	8	0.875	7.88
5	11	1.21	5.66	22	8	0.875	9.25
6	12.5	1.31	6.73	30	12	0.875	10.62
8	15	1.31	8.73	40	12	1	13
10	17.5	1.5	10.88	56	16	1.125	15.25
12	20.5	1.63	12.88	83	16	1.25	17.75
14	23	1.94	14.19	128	20	1.25	20.25
16	25.5	2.14	16.19	167	20	1.375	22.5
18	28	2.25	18.19	204	24	1.375	24.75
20	30.5	2.33	20.19	247	24	1.375	27
22	33	2.5	22.19	307	24	1.375	29.25
24	36	2.69	24.19	388	24	1.625	32
26	38.25	3	26.25	451	28	1.875	34.5
28	40.75	3.13	28.25	532	28	1.875	37
30	43	3.15	30.25	586	28	1.875	39.25
32	45.25	3.25	32.25	657	28	1.875	41.5
34	47.5	3.38	34.25	741	28	1.875	43.5
36	50	3.46	36.25	802	32	2.125	46
38	52.25	3.5	38.25	874	32	2.125	48
40	54.25	3.63	40.25	937	36	2.125	50.25
42	57	3.81	42.25	1103	36	2.125	52.75
44	59.25	4	44.25	1237	36	2.125	55
46	61.5	4.13	46.25	1344	40	2.125	57.25
48	65	4.5	48.25	1718	40	2.125	60.75

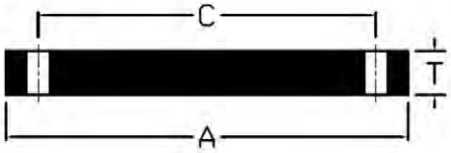
AWWA C207-07 Class B Blind



- All dimensions are in inches.
- Blind flanges shall be machined with center island to match the mating flange.

Nom. Size	Outside Diam. (A)	Thickness (T)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	0.625	14	8	0.75	7.5
5	10	0.625	17	8	0.875	8.5
6	11	0.688	22	8	0.875	9.5
8	13.5	0.688	33	8	0.875	11.75
10	16	0.688	46	12	1	14.25
12	19	0.719	68	12	1	17
14	21	0.791	90	12	1.125	18.75
16	23.5	0.892	125	16	1.125	21.25
18	25	0.95	149	16	1.25	22.75
20	27.5	1.04	207	20	1.25	25
22	29.5	1.132	255	20	1.375	27.25
24	32	1.216	320	20	1.375	29.5
26	34.25	1.307	390	24	1.375	31.75
28	36.5	1.398	470	28	1.375	34
30	38.75	1.477	546	28	1.375	36
32	41.75	1.581	686	28	1.625	38.5
34	43.75	1.661	787	32	1.625	40.5
36	46	1.751	913	32	1.625	42.75
38	48.75	1.853	1079	32	1.625	45.25
40	50.75	1.933	1215	36	1.625	47.25
42	53	2.023	1382	36	1.625	49.5
44	55.25	2.114	1563	40	1.625	51.75
46	57.25	2.194	1737	40	1.625	53.75
48	59.5	2.285	1948	44	1.625	56
50	61.75	2.377	2176	44	1.875	58.25
52	64	2.468	2420	44	1.875	60.5
54	66.25	2.559	2682	44	1.875	62.75
60	73	2.82	3566	52	1.875	69.25
66	80	3.092	4670	52	1.875	76
72	86.5	3.353	5894	60	1.875	82.5

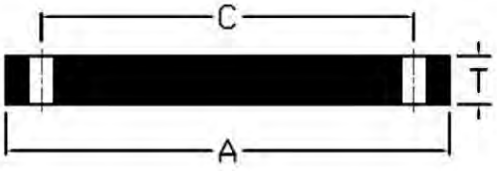
AWWA C207-07 Class D Blind



- All dimensions are in inches.
- Blind flanges shall be machined with center island to match the mating flange.

Nom. Size	Outside Diam. (A)	Thickness (T)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	0.625	14	8	0.75	7.5
5	10	0.65	17	8	0.875	8.5
6	11	0.693	22	8	0.875	9.5
8	13.5	0.812	38	8	0.875	11.75
10	16	0.953	61	12	1	14.25
12	19	1.117	100	12	1	17
14	21	1.133	123	12	1.125	18.75
16	23.5	1.265	171	16	1.125	21.25
18	25	1.331	202	16	1.25	22.75
20	27.5	1.448	275	20	1.25	25
22	29.5	1.568	340	20	1.375	27.25
24	32	1.661	421	20	1.375	29.5
26	34.25	1.786	515	24	1.375	31.75
28	36.5	1.906	621	28	1.375	34
30	38.75	2.008	734	28	1.375	36
32	41.75	2.15	907	28	1.625	38.5
34	43.75	2.25	1039	32	1.625	40.5
36	46	2.37	1204	32	1.625	42.75
38	48.75	2.506	1424	32	1.625	45.25
40	50.75	2.609	1603	36	1.625	47.25
42	53	2.729	1823	36	1.625	49.5
44	55.25	2.849	2062	40	1.625	51.75
46	57.25	2.952	2290	40	1.625	53.75
48	59.5	3.072	2568	44	1.625	56
50	61.75	3.196	2871	44	1.875	58.25
52	64	3.315	3192	44	1.875	60.5
54	66.25	3.435	3538	44	1.875	62.75
60	73	3.779	4703	52	1.875	69.25
66	80	4.136	6157	52	1.875	76
72	86.5	4.48	7770	60	1.875	82.5

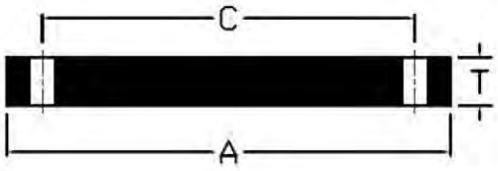
AWWA C207-07 Class E Blind



- All dimensions are in inches.
- Blind flanges shall be machined with center island to match the mating flange.

Nom. Size	Outside Diam. (A)	Thickness (T)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	9	1.125	23	8	0.75	7.5
5	10	1.188	29	8	0.875	8.5
6	11	1.313	39	8	0.875	9.5
8	13.5	1.5	66	8	0.875	11.75
10	16	1.563	96	12	1	14.25
12	19	1.75	151	12	1	17
14	21	1.875	196	12	1.125	18.75
16	23.5	2	261	16	1.125	21.25
18	25	2.125	313	16	1.25	22.75
20	27.5	2.375	431	20	1.25	25
22	29.5	2.5	520	20	1.375	27.25
24	32	2.625	641	20	1.375	29.5
26	34.25	2.75	767	24	1.375	31.75
28	36.5	2.75	871	28	1.375	34
30	38.75	2.875	1023	28	1.375	36
32	41.75	3	1236	28	1.625	38.5
34	43.75	3.05	1379	32	1.625	40.5
36	46	3.209	1599	32	1.625	42.75
38	48.75	3.394	1894	32	1.625	45.25
40	50.75	3.533	2132	36	1.625	47.25
42	53	3.695	2427	36	1.625	49.5
44	55.25	3.857	2747	40	1.625	51.75
46	57.25	3.997	3052	40	1.625	53.75
48	59.5	4.159	3424	44	1.625	56
50	61.75	4.327	3830	44	1.875	58.25
52	64	4.489	4262	44	1.875	60.5
54	66.25	4.651	4725	44	1.875	62.75
60	73	5.116	6288	52	1.875	69.25
66	80	5.601	8243	52	1.875	76
72	86.5	6.066	10411	60	1.875	82.5

AWWA C207-07 Class F Blind



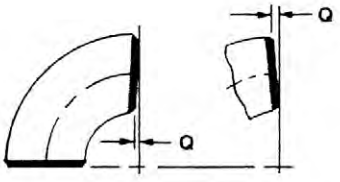
- All dimensions are in inches.
- Blind flanges shall be machined with center island to match the mating flange.

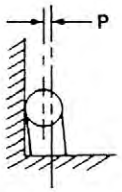
Nom. Size	Outside Diam. (A)	Thickness (T)	Approx. Weight (lbs)	Number of Bolt Holes	Diam. of Bolt Holes	Diam. of Bolt Circle (C)
4	10	1.13	28	8	0.875	7.88
5	11	1.21	36	8	0.875	9.25
6	12.5	1.31	50	12	0.875	10.62
8	15	1.31	72	12	1	13
10	17.5	1.5	111	16	1.125	15.25
12	20.5	1.63	164	16	1.25	17.75
14	23	1.94	243	20	1.25	20.25
16	25.5	2.14	328	20	1.375	22.5
18	28	2.25	414	24	1.375	24.75
20	30.5	2.33	521	24	1.375	27
22	33	2.5	651	24	1.375	29.25
24	36	2.69	830	24	1.625	32
26	38.25	3	1038	28	1.875	34.5
28	40.75	3.13	1226	28	1.875	37
30	43	3.166	1380	28	1.875	39.25
32	45.25	3.332	1603	28	1.875	41.5
34	47.5	3.475	1839	28	1.875	43.5
36	50	3.671	2146	32	2.125	46
38	52.25	3.815	2431	32	2.125	48
40	54.25	3.982	2730	36	2.125	50.25
42	57	4.171	3151	36	2.125	52.75
44	59.25	4.338	3535	36	2.125	55
46	61.5	4.505	3949	40	2.125	57.25
48	65	4.781	4671	40	2.125	60.75

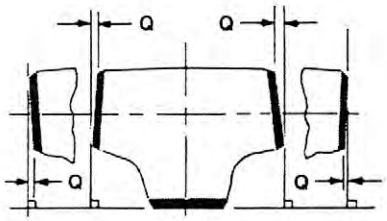
Technical

BUTT WELDING FITTINGS

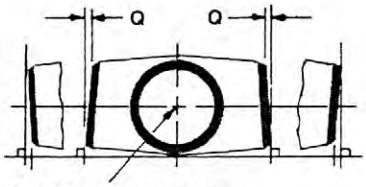
The tolerances shown are in accordance with the dimensional tolerances approved by the American National Standards Institute (ANSI B16.9) for all carbon and alloy fittings except Short Radius Elbows and Returns. These are governed by ANSI B16.28.







Tees



This End Flush Against Square

All Fittings				90 Deg. and 45 Deg. Elbows and Tees	Reducers and Lap Joint Stub Ends	Caps
Nominal Pipe Size (NPS)	Outside (1) Diameter at Bevel D	Inside (2) Diameter at End	Wall (2) Thickness t	Center-to-End Dimension A, B, C, M	Overall Length F, H	Overall Length E
½ to 2½	+0.06 −0.03	±0.03	Not less than 87.5% of nominal thickness	±0.06	±0.06	±0.12
3 to 3½	±0.06	±0.06		±0.06	±0.06	±0.12
4	±0.06	±0.06		±0.06	±0.06	±0.12
5 to 8	+0.09 −0.06	±0.06		±0.06	±0.06	±0.25
10 to 18	+0.16 −0.12	±0.12		±0.09	±0.09	±0.25
20 to 24	+0.25 −0.19	±0.19		±0.09	±0.09	±0.25
26 to 30	+0.25 −0.19	±0.19		±0.12	±0.19	±0.38
32 to 48	+0.25 −0.19	±0.19		±0.19	±0.19	±0.38

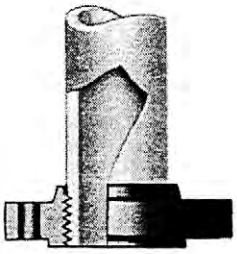
Nominal Pipe Size	Angularity Tol.	
	Off Angle Q	Off Plane P
½ to 4	0.03	0.06
5 to 8	0.06	0.12
10 to 12	0.09	0.19
14 to 16	0.09	0.25
18 to 24	0.12	0.38
26 to 30	0.19	0.38
32 to 42	0.19	0.50
44 to 48	0.19	0.75

All dimensions are in inches.

(1) Out-of-round is the sum of absolute values of plus and minus tolerance.

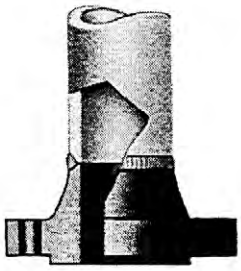
(2) The inside diameter at ends and the nominal wall thicknesses are to be specified by the purchaser.

Methods of Attachment for Standard Types of Flanges



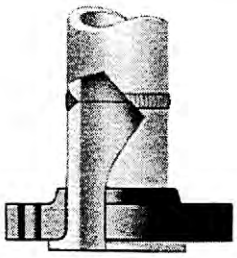
THREADED FLANGES

Threaded Flanges are, of course, attached by screwing to threaded pipe ends. The clean, sharp threads and great precision of our Threaded Flanges assure the greatest possible ease in making up strong, tight joints.



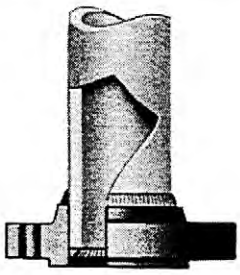
WELDING NECK FLANGES

This type of flange is attached by butt welding to the adjoining pipe or shell. The weld may be made either manually or automatically with or without a backing strip. Sound welds are readily obtained with any recognized welding procedure.



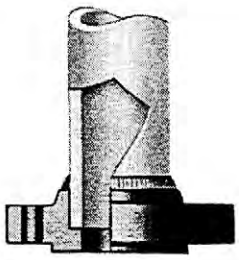
LAP JOINT FLANGES

Lap Joint Flanges are most frequently used with Lap Joint Stub Ends, although in some cases the lap is formed on the pipe end. Since they are free to rotate or swivel, there is no problem of bolt hole alignment. Such joints may be readily broken for inspection, cleaning, etc. The radius at the ID of the flange face accommodates that at the back of the lap, thus permitting more uniform application of loading.



SLIP-ON FLANGES

Although recommended practice in attaching Slip-On type Flanges is to weld both at the flange hub and the pipe end, for mild service conditions only one is sometimes employed. In this case the weld is normally made at the pipe end.



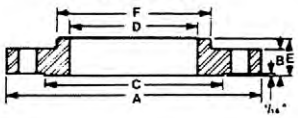
SOCKET WELDING FLANGES

In attaching Socket Welding Flanges, the pipe end is inserted into the socket and then welded at the flange hub. An inside weld at the pipe end is frequently made for greater strength or, with grinding, to provide a smooth bore without pockets or recesses.

Dimensional Tolerances for Forged Steel Flanges

threaded, lap joint, slip-on and blind flanges

ANSI B16.5

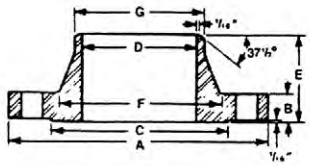


Outside Diameter (A)	When O. D. is 24" or less	±1/16"*	**Outside Dia. of Hub (F)**	12" and Smaller	+3/32"* −1/16"*
	When O. D. is over 24"	±1/8"*		Over 12"	±1/8"*
Inside Diameter (D)	Threaded	Within limits on boring gauge	**Drilling**	Bolt Circle	±1/16"
	Slip-on and Lap Joint	10" and smaller +1/32", −0" 12" and larger +1/16", −0"		Bolt hole spacing	±1/32"
				Eccentricity between bolt circle diameter and machined facing diameter	2½" and smaller 1/32" Max. 3" and larger 1/16" Max.
Diameter of Contact Face (C)	1/16" Raised Face	±1/32"	**Overall Height (E)**	On flanges 18" and smaller	+1/8"* −1/32"*
	¼" Raised Face, Tongue and Groove, or Male and Female	±1/64"		On flanges larger than 18"	+3/16"* −1/16"*
Diameter of Counterbore	Same as for Inside Diameter		**Thickness (B)**	18" and smaller	+1/8" −0"
				Over 18"	+3/16" −0"
				Where allowance has been left on face for finish: All sizes	+1/8"* −1/16"*

* This tolerance not covered by ANSI B16.5. Dimensions are approximate.

welding neck flanges

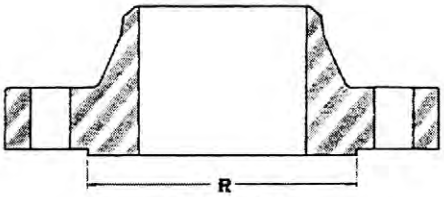
ANSI B16.5



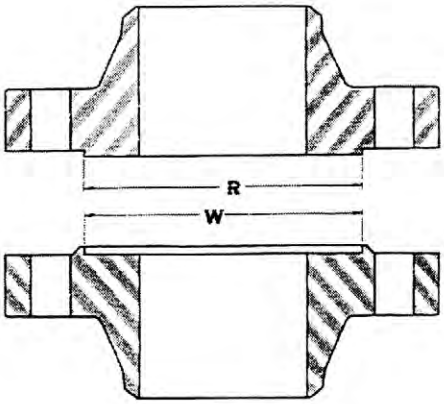
Outside Diameter (A)	When O. D. is 24" or less	±1/16"*	**Drilling**	Bolt Circle	±1/16"
	When O. D. is over 24"	±1/8"*		Bolt hole spacing	±1/32"
Inside Diameter (D)	10" and smaller	±1/32"		Eccentricity between bolt circle diameter and machined facing diameter	2½" and smaller 1/32" Max. 3" and larger 1/16" Max.
	12" to 18"	±1/16"	**Width of Land**	All sizes	±1/32"
	Over 18"	+1/8" −1/16"	**Angle of Hub Bevel**	All sizes	±2½°
Diameter of Contact Face (C)	1/16" Raised Face	±1/32"	**Overall Height (E)**	10" and smaller	±1/16"
	¼" Raised Face, Tongue and Groove, or Male and Female	±1/64"		12" and larger	±1/8"
Diameter of Hub at Point of Welding (G)	5" and smaller	+3/32" −1/32"	**Thickness (B)**	18" and smaller	+1/8" −0"
	6" and larger	+5/32" −1/32"		Over 18"	+3/16" −0"
Diameter of Hub at Base (F)	When "F" is 24" and smaller	±1/16"*		Where allowance has been left on face for finish: All sizes	+1/8"* −1/16"*
	When "F" is over 24"	±1/8"*			

* This tolerance not covered by ANSI B16.5. Dimensions are approximate.

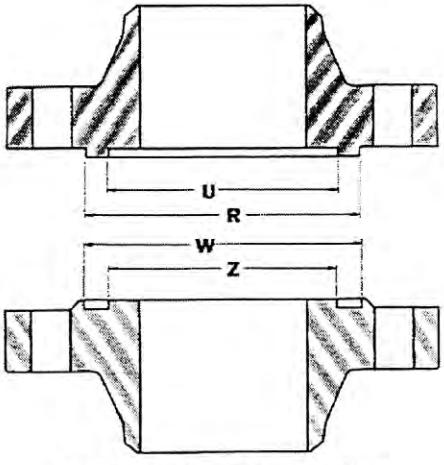
AMERICAN STANDARD FLANGE FACINGS



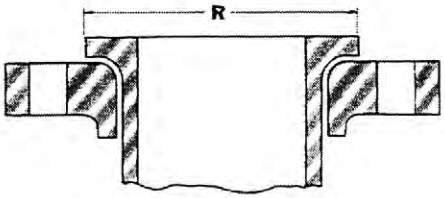
RAISED FACE



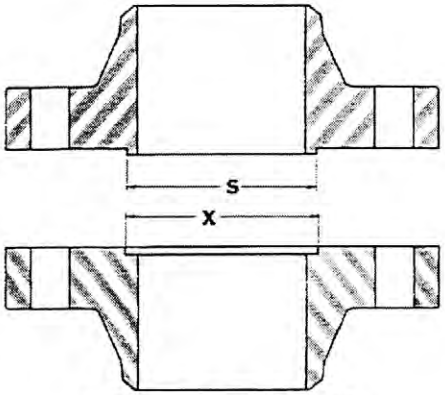
LARGE MALE AND FEMALE



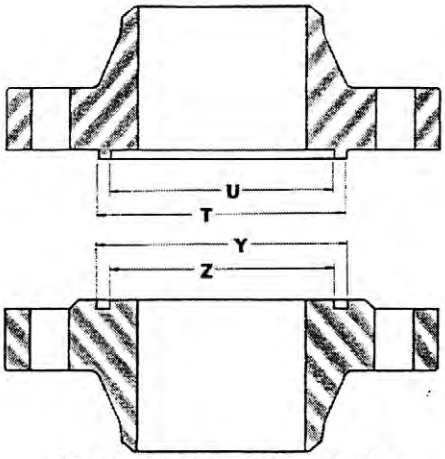
LARGE TONGUE AND GROOVE



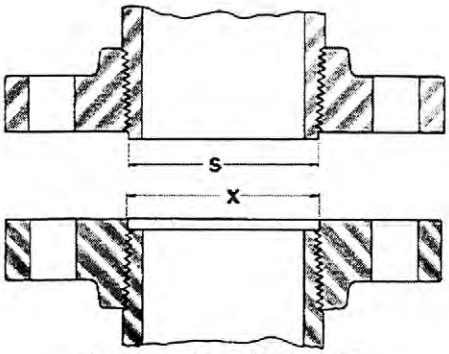
LAP JOINT



SMALL MALE AND FEMALE



SMALL TONGUE AND GROOVE



SMALL MALE AND FEMALE
(on end of pipe)

AMERICAN STANDARD FLANGE FACINGS

For 150, 300, 400, 600, 900, 1500 and 2500 Lb. Flanges

Nominal Pipe Size	Outside Diameter[3]			I.D. of Large and Small Tongue[3,5]	Outside Diameter[3]			I.D. of Large and Small Groove[3,5]	Height		Depth of Groove or Female
	Raised Face, Lap Joint, Large Male and Large Tongue[5]	Small Male[4,5]	Small Tongue[5]		Large Female and Large Groove[5]	Small Female[4,5]	Small Groove[5]		Raised Face 150 and 300-Pound Standards[1]	Raised Face, Large and Small Male and Tongue 400, 600, 900, 1500 and 2500-Pound Standards[2]	
	R	S	T	U	W	X	Y	Z			
½	1 3/8	23/32	1 3/8	1	1 7/16	25/32	1 7/16	15/16	1/16	1/4	3/16
¾	1 11/16	15/16	1 11/16	1 5/16	1 3/4	1	1 3/4	1 1/4	1/16	1/4	3/16
1	2	1 3/16	1 7/8	1 1/2	2 1/16	1 1/4	1 15/16	1 7/16	1/16	1/4	3/16
1¼	2 1/2	1 1/2	2 1/4	1 7/8	2 5/16	1 9/16	2 5/16	1 13/16	1/16	1/4	3/16
1½	2 7/8	1 3/4	2 1/2	2 1/8	2 15/16	1 13/16	2 9/16	2 1/16	1/16	1/4	3/16
2	3 5/8	2 1/4	3 1/4	2 7/8	3 11/16	2 5/16	3 5/16	2 13/16	1/16	1/4	3/16
2½	4 1/8	2 11/16	3 3/4	3 3/8	4 1/16	2 3/4	3 13/16	3 5/16	1/16	1/4	3/16
3	5	3 5/16	4 5/8	4 1/4	5 1/16	3 3/8	4 11/16	4 3/16	1/16	1/4	3/16
3½	5 1/2	3 13/16	5 1/8	4 3/4	5 9/16	3 7/8	5 3/16	4 11/16	1/16	1/4	3/16
4	6 3/16	4 5/16	5 11/16	5 3/16	6 1/4	4 3/8	5 3/4	5 1/8	1/16	1/4	3/16
5	7 5/16	5 3/8	6 13/16	6 5/16	7 3/8	5 7/16	6 7/8	6 1/4	1/16	1/4	3/16
6	8 1/2	6 3/8	8	7 1/2	8 9/16	6 7/16	8 1/16	7 7/16	1/16	1/4	3/16
8	10 5/8	8 3/8	10	9 3/8	10 11/16	8 7/16	10 1/16	9 5/16	1/16	1/4	3/16
10	12 3/4	10 1/2	12	11 1/4	12 13/16	10 9/16	12 1/16	11 3/16	1/16	1/4	3/16
12	15	12 1/2	14 1/4	13 1/2	15 1/16	12 9/16	14 5/16	13 7/16	1/16	1/4	3/16
14	16 1/4	13 3/4	15 1/2	14 3/4	16 5/16	13 13/16	15 9/16	14 11/16	1/16	1/4	3/16
16	18 1/2	15 3/4	17 5/8	16 3/4	18 9/16	15 13/16	17 11/16	16 11/16	1/16	1/4	3/16
18	21	17 3/4	20 1/8	19 1/4	21 1/16	17 13/16	20 3/16	19 3/16	1/16	1/4	3/16
20	23	19 3/4	22	21	23 1/16	19 13/16	22 1/16	20 15/16	1/16	1/4	3/16
24	27 1/4	23 3/4	26 1/4	25 1/4	27 5/16	23 13/16	26 5/16	25 3/16	1/16	1/4	3/16

All dimensions are in inches.

[1] Regular facing for 150 and 300 Lb. steel flanged fittings and flange standards is a 1/16 inch raised face included in the minimum flange thickness. A 1/16 inch raised face is also permitted on the 400, 600, 900, 1500 and 2500 Lb. flange standards, but it must be added to the minimum flange thickness.

[2] Regular facing for 400, 600, 900, 1500 and 2500 Lb. flange standards is a 1/4 inch raised face not included in minimum flange thickness dimensions.

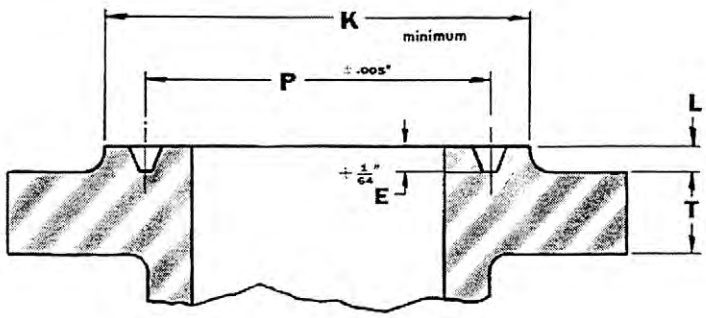
[3] A tolerance of plus or minus 0.016 inch (1/64 inch) is allowed on the inside and outside diameters of all facings.

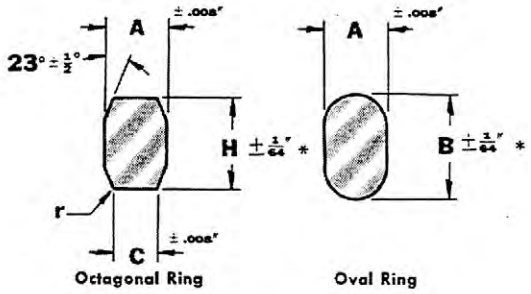
[4] Care should be taken in the use of joints of these dimensions, (they apply particularly on lines where the joint is made on the end of pipe) to insure that pipe used is thick enough to permit sufficient bearing surface to prevent crushing the gasket. Threaded companion flanges are furnished with plain face and are threaded with American Standard Locknut Thread.

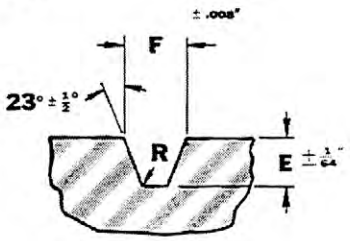
[5] Gaskets for male-female and tongue-groove joints shall cover the bottom of the recess with minimum clearances taking into account the tolerances prescribed in Note 3.

Facing Dimensions for Ring Joint Flanges

FACING DIMENSIONS FOR RING JOINT FLANGES







150 LB. STANDARD

Nominal Pipe Size	Pitch Diam. Ring & Groove	GROOVE DIMENSIONS			RING DIMENSIONS				Diam. Raised Face or Lap	Distance Between Flanges When Ring is Compressed	Ring and Groove Number
		Width	Depth	Radius	Width	Height Oval	Height Octag-onal	Width of Flat			
	P	F	E	R	A	B	H	C	K		
1	1 7/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	2 1/2	5/32	R 15
1 1/4	2 1/4	11/32	1/4	1/32	5/16	9/16	1/2	.206	2 7/8	5/32	R 17
1 1/2	2 9/16	11/32	1/4	1/32	5/16	9/16	1/2	.206	3 1/4	5/32	R 19
2	3 1/4	11/32	1/4	1/32	5/16	9/16	1/2	.206	4	5/32	R 22
2 1/2	4	11/32	1/4	1/32	5/16	9/16	1/2	.206	4 3/4	5/32	R 25
3	4 1/2	11/32	1/4	1/32	5/16	9/16	1/2	.206	5 1/4	5/32	R 29
3 1/2	5 3/16	11/32	1/4	1/32	5/16	9/16	1/2	.206	6 1/16	5/32	R 33
4	5 7/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	6 3/4	5/32	R 36
5	6 3/4	11/32	1/4	1/32	5/16	9/16	1/2	.206	7 5/8	5/32	R 40
6	7 5/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	8 5/8	5/32	R 43
8	9 3/4	11/32	1/4	1/32	5/16	9/16	1/2	.206	10 3/4	5/32	R 48
10	12	11/32	1/4	1/32	5/16	9/16	1/2	.206	13	5/32	R 52
12	15	11/32	1/4	1/32	5/16	9/16	1/2	.206	16	5/32	R 56
14	15 5/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	16 3/4	1/8	R 59
16	17 7/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	19	1/8	R 64
18	20 3/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	21 1/2	1/8	R 68
20	22	11/32	1/4	1/32	5/16	9/16	1/2	.206	23 1/2	1/8	R 72
22	24 1/4	11/32	1/4	1/32	5/16	- -	1/2	.206	25 1/2	1/8	R 80
24	26 1/2	11/32	1/4	1/32	5/16	9/16	1/2	.206	28	1/8	R 76

All dimensions are in inches.

Unless otherwise specified by the purchaser, Ring Type Joint Flanges will be furnished in accordance with these details.

The depth of groove is added to the minimum flange thickness. Raised face "L" is equal to groove dimension "E" but is not subject to tolerances for "E".

* A plus tolerance of 3/64 in. for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in. throughout its entire circumference.

Dimension "R" is max.

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

† For Ring Joints with Lapped Flanges in the 300, 400 and 600 lb. standards, Ring and Groove Number R30 are used instead of R31. Dimensions of Ring R30 are identical with those of R31, except that the pitch diameter is 4 5/8".

Facing Dimensions for Ring Joint Flanges *(continued)*

300, 400 and 600 LB. STANDARDS *(Ring Joint Facing Dimensions—Continued)*

Nominal Pipe Size	Pitch Diam. Ring & Groove	GROOVE DIMENSIONS			RING DIMENSIONS				Diam. Raised Face or Lap	Distance Between Flanges When Ring is Compressed			Ring and Groove Number
						Height		Width of Flat					
		Width	Depth	Radius	Width	Oval	Octag-onal			300 lb. Std.	400 lb. Std.	600 lb. Std:	
	P	F	E	R	A	B	H	C	K				
½	1 11/32	9/32	7/32	1/32	1/4	7/16	3/8	.170	2	1/8	1/8	1/8	R 11
¾	1 11/16	11/32	1/4	1/32	5/16	9/16	1/2	.206	2 1/2	5/32	5/32	5/32	R 13
1	2	11/32	1/4	1/32	5/16	9/16	1/2	.206	2 3/4	5/32	5/32	5/32	R 16
1 1/4	2 3/8	11/32	1/4	1/32	5/16	9/16	1/2	.206	3 1/8	5/32	5/32	5/32	R 18
1 1/2	2 11/16	11/32	1/4	1/32	5/16	9/16	1/2	.206	3 5/16	5/32	5/32	5/32	R 20
2	3 1/4	13/32	5/16	1/32	7/16	11/16	5/8	.305	4 1/4	7/32	3/16	3/16	R 23
2 1/2	4	15/32	5/16	1/32	7/16	11/16	5/8	.305	5	7/32	3/16	3/16	R 26
3†	4 7/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	5 3/4	7/32	3/16	3/16	R 31
3 1/2	5 5/16	15/32	5/16	1/32	7/16	11/16	5/8	.305	6 1/4	7/32	3/16	3/16	R 34
4	5 7/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	6 7/8	7/32	7/32	3/16	R 37
5	7 1/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	8 1/4	7/32	7/32	3/16	R 41
6	8 5/16	15/32	5/16	1/32	7/16	11/16	5/8	.305	9 1/2	7/32	7/32	3/16	R 45
8	10 5/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	11 7/8	7/32	7/32	3/16	R 49
10	12 3/4	15/32	5/16	1/32	7/16	11/16	5/8	.305	14	7/32	7/32	3/16	R 53
12	15	15/32	5/16	1/32	7/16	11/16	5/8	.305	16 1/4	7/32	7/32	3/16	R 57
14	16 1/2	15/32	5/16	1/32	7/16	11/16	5/8	.305	18	7/32	7/32	3/16	R 61
16	18 1/2	15/32	5/16	1/32	7/16	11/16	5/8	.305	20	7/32	7/32	3/16	R 65
18	21	15/32	5/16	1/32	7/16	11/16	5/8	.305	22 5/8	7/32	7/32	3/16	R 69
20	23	17/32	3/8	1/16	1/2	3/4	11/16	.341	25	7/32	7/32	3/16	R 73
22	25	19/32	7/16	1/16	9/16	- -	3/4	.377	27	- -	- -	- -	R 81
24	27 1/4	21/32	7/16	1/16	5/8	7/8	13/16	.413	29 1/2	1/4	1/4	7/32	R 77
MSS—SP44 Classes 300, 400 and 600													
26	29 1/2	23/32	1/2	1/16	3/4	- -	15/16	.485	31 7/8	This dimension not shown for 22" size in ASA Standard or for sizes 26" through 36" in MSS-SP44			R 93
28	31 1/2	23/32	1/2	1/16	3/4	- -	15/16	.485	33 7/8				R 94
30	33 3/4	23/32	1/2	1/16	3/4	- -	15/16	.485	36 1/8				R 95
32	36	29/32	9/16	1/16	7/8	- -	1 1/16	.583	38 3/4				R 96
34	38	29/32	9/16	1/16	7/8	- -	1 1/16	.583	40 3/4				R 97
36	40 1/4	29/32	9/16	1/16	7/8	- -	1 1/16	.583	43				R 98

900 LB. STANDARD *(for sizes 1/2" through 2 1/2", use 1500 lb. Standard dimensions)*

3	4 7/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	6 1/8	- -	5/32	- -	R 31
4	5 7/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	7 1/8	- -	5/32	- -	R 37
5	7 1/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	8 1/2	- -	5/32	- -	R 41
6	8 5/16	15/32	5/16	1/32	7/16	11/16	5/8	.305	9 1/2	- -	5/32	- -	R 45
8	10 5/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	12 1/8	- -	5/32	- -	R 49
10	12 3/4	15/32	5/16	1/32	7/16	11/16	5/8	.305	14 1/4	- -	5/32	- -	R 53
12	15	15/32	5/16	1/32	7/16	11/16	5/8	.305	16 1/2	- -	5/32	- -	R 57
14	16 1/2	21/32	7/16	1/16	5/8	7/8	13/16	.413	18 3/8	- -	5/32	- -	R 62
16	18 1/2	21/32	7/16	1/16	5/8	7/8	13/16	.413	20 5/8	- -	5/32	- -	R 66
18	21	25/32	1/2	1/16	3/4	1	15/16	.485	23 3/8	- -	3/16	- -	R 70
20	23	25/32	1/2	1/16	3/4	1	15/16	.485	25 1/2	- -	3/16	- -	R 74
24	27 1/4	1 1/16	5/8	3/32	1	1 5/16	1 1/4	.681	30 3/8	- -	7/32	- -	R 78
MSS—SP44 Class 900													
26	29 1/2	1 3/16	1 1/16	3/32	1 1/8	- -	1 3/8	.780	32 3/4	This dimension not shown in MSS-SP44			R 100
28	31 1/2	1 5/16	1 1/16	3/32	1 1/4	- -	1 1/2	.879	35				R 101
30	33 3/4	1 5/16	1 1/16	3/32	1 1/4	- -	1 1/2	.879	37 1/4				R 102
32	36	1 5/16	1 1/16	3/32	1 1/4	- -	1 1/2	.879	39 1/2				R 103
34	38	1 7/16	1 3/16	3/32	1 3/8	- -	1 5/8	.977	42				R 104
36	40 1/4	1 7/16	1 3/16	3/32	1 3/8	- -	1 5/8	.977	44 1/4				R 105

For applicable footnotes see opposite page.

FACING DIMENSIONS FOR RING JOINT FLANGES

(Continued from preceding page)

1500 LB. STANDARD

Nominal Pipe Size	Pitch Diam. Ring & Groove	GROOVE DIMENSIONS			RING DIMENSIONS				Diam. Raised Face or Lap	Distance Between Flanges When Ring is Compressed	Ring and Groove Number
						Height		Width of Flat			
		Width	Depth	Radius	Width	Oval	Octag-onal				
	P	F	E	R	A	B	H	C	K		
½	1 9/16	11/32	¼	1/32	5/16	9/16	½	.206	2 3/8	5/32	R 12
¾	1 ¾	11/32	¼	1/32	5/16	9/16	½	.206	2 5/8	5/32	R 14
1	2	11/32	¼	1/32	5/16	9/16	½	.206	2 13/16	5/32	R 16
1¼	2 3/8	11/32	¼	1/32	5/16	9/16	½	.206	3 3/16	5/32	R 18
1½	2 11/16	11/32	¼	1/32	5/16	9/16	½	.206	3 5/8	5/32	R 20
2	3 ¾	15/32	5/16	1/32	7/16	11/16	5/8	.305	4 7/8	1/8	R 24
2½	4 ¼	15/32	5/16	1/32	7/16	11/16	5/8	.305	5 3/8	1/8	R 27
3	5 3/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	6 5/8	1/8	R 35
4	6 3/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	7 5/8	1/8	R 39
5	7 5/8	15/32	5/16	1/32	7/16	11/16	5/8	.305	9	1/8	R 44
6	8 5/16	17/32	3/8	1/16	½	¾	11/16	.341	9 ¾	1/8	R 46
8	10 5/8	21/32	7/16	1/16	5/8	7/8	13/16	.413	12½	5/32	R 50
10	12 ¾	21/32	7/16	1/16	5/8	7/8	13/16	.413	14 5/8	5/32	R 54
12	15	29/32	9/16	1/16	7/8	1 1/8	1 1/16	.583	17 ¼	3/16	R 58
14	16½	1 1/16	5/8	3/32	1	1 5/16	1 ¼	.681	19 ¼	7/32	R 63
16	18½	1 3/16	11/16	3/32	1 1/8	1 7/16	1 3/8	.780	21½	5/16	R 67
18	21	1 3/16	11/16	3/32	1 1/8	1 7/16	1 3/8	.780	24 1/8	5/16	R 71
20	23	1 5/16	11/16	3/32	1 ¼	1 9/16	1 ½	.879	26½	3/8	R 75
24	27 ¼	1 7/16	13/16	3/32	1 3/8	1 ¾	1 5/8	.977	31 ¼	7/16	R 79

2500 LB. STANDARD

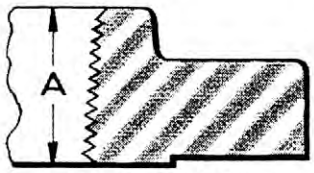
Nominal Pipe Size	Pitch Diam. Ring & Groove	GROOVE DIMENSIONS			RING DIMENSIONS				Diam. Raised Face or Lap	Distance Between Flanges When Ring is Compressed	Ring and Groove Number
						Height		Width of Flat			
		Width	Depth	Radius	Width	Oval	Octag-onal				
	P	F	E	R	A	B	H	C	K		
½	1 11/16	11/32	¼	1/32	5/16	9/16	½	.206	2 9/16	5/32	R 13
¾	2	11/32	¼	1/32	5/16	9/16	½	.206	2 7/8	5/32	R 16
1	2 3/8	11/32	¼	1/32	5/16	9/16	½	.206	3 ¼	5/32	R 18
1¼	2 27/32	15/32	5/16	1/32	7/16	11/16	5/8	.305	4	1/8	R 21
1½	3 ¼	15/32	5/16	1/32	7/16	11/16	5/8	.305	4½	1/8	R 23
2	4	15/32	5/16	1/32	7/16	11/16	5/8	.305	5 ¼	1/8	R 26
2½	4 3/8	17/32	3/8	1/16	½	¾	11/16	.341	5 7/8	1/8	R 28
3	5	17/32	3/8	1/16	½	¾	11/16	.341	6 5/8	1/8	R 32
4	6 3/16	21/32	7/16	1/16	5/8	7/8	13/16	.413	8	5/32	R 38
5	7½	25/32	½	1/16	¾	1	15/16	.485	9½	5/32	R 42
6	9	25/32	½	1/16	¾	1	15/16	.485	11	5/32	R 47
8	11	29/32	9/16	1/16	7/8	1 1/8	1 1/16	.583	13 3/8	3/16	R 51
10	13½	1 3/16	11/16	3/32	1 1/8	1 7/16	1 3/8	.780	16 ¾	¼	R 55
12	16	1 5/16	11/16	3/32	1 ¼	1 9/16	1 ½	.879	19½	5/16	R 60

All dimensions are in inches.

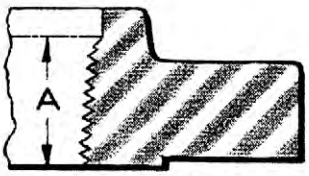
Unless otherwise specified by the purchaser, Ring Type Joint Flanges will be furnished in accordance with these details.

The depth of groove is added to the minimum flange thickness. Raised face "L" is equal to groove dimension "E" but is not subject to tolerances for "E".

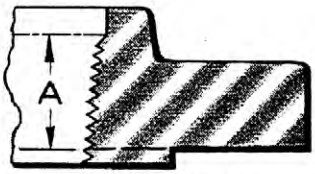
Threading Practice for American Standard Flanges



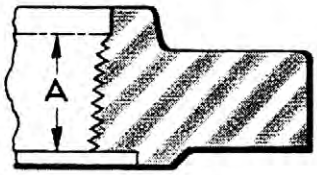
150 LB. STANDARD
WITH 1/16" RAISED FACE



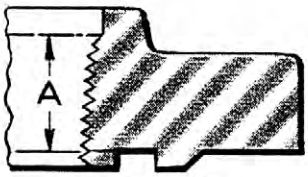
300 LB. STANDARD
WITH 1/16" RAISED FACE



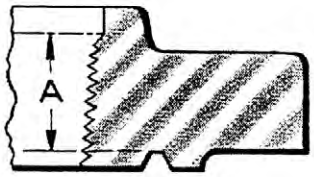
400 LB. STANDARD
AND HEAVIER
WITH 1/4" RAISED OR MALE FACE



ALL STANDARDS
WITH FEMALE FACE



ALL STANDARDS
WITH GROOVE FACE

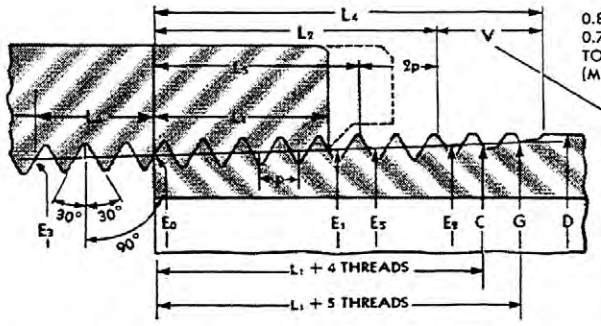


ALL STANDARDS
WITH RING JOINT FACE

Nominal Pipe Size	A—THREAD LENGTHS, INCHES						
	150 Lb.	300 Lb.	400 Lb.	600 Lb.	900 Lb.	1500 Lb.	2500 Lb.
½	5/8	5/8	5/8	5/8	7/8	7/8	1 1/8
¾	5/8	5/8	5/8	5/8	1	1	1 1/4
1	1 1/16	1 1/16	1 1/16	1 1/16	1 1/8	1 1/8	1 3/8
1 1/4	1 3/16	1 3/16	1 3/16	1 3/16	1 3/16	1 3/16	1 1/2
1 1/2	7/8	7/8	7/8	7/8	1 1/4	1 1/4	1 3/4
2	1	1 1/8	1 1/8	1 1/8	1 1/2	1 1/2	2
2 1/2	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8	2 1/4
3	1 3/16	1 1/4	1 3/8	1 3/8	1 5/8	2	2 1/2
3 1/2	1 1/4	1 7/16	1 9/16	1 9/16	- -	- -	- -
4	1 5/16	1 7/16	1 7/16	1 5/8	1 7/8	2 1/4	2 3/4
5	1 7/16	1 11/16	1 11/16	1 7/8	2 1/8	2 1/2	3
6	1 9/16	1 13/16	1 13/16	2	2 1/4	2 3/4	3 1/4
8	1 3/4	2	2	2 3/8	2 1/2	3	3 3/4
10	1 15/16	2 3/16	2 3/16	2 9/16	2 13/16	3 5/16	4 1/4
12	2 3/16	2 3/8	2 3/8	2 3/4	3	3 5/8	4 3/4
14	2 1/4	2 1/2	2 1/2	2 7/8	3 1/4	- -	- -
16	2 1/2	2 11/16	2 11/16	3 1/16	3 3/8	- -	- -
18	2 11/16	2 3/4	2 3/4	3 1/8	3 1/2	- -	- -
20	2 7/8	2 7/8	2 7/8	3 1/4	3 5/8	- -	- -
24	3 1/4	3 1/4	3 1/4	3 5/8	4	- -	- -

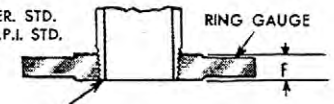
Flanges shall be tapped with American Standard Taper Pipe Threads in accordance with ASA Standard B2.1 (see next page) but shall have longer thread lengths in proportion to the flange thickness for high pressure-temperature services. Pitch diameter E_1, at intersection of chamfer cone, and pitch diameter of thread cone are maintained. Gauging notch of the plug gauge should come flush at this point with a manufacturing tolerance of ± one turn. Pitch diameter at small end of thread E_0, is made proportionally smaller in flanges.

Threading Practice for American Standard Flanges *(continued)*

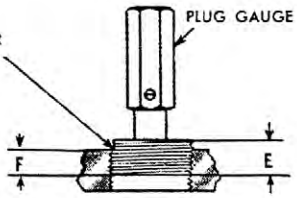


0.8P = THREAD DEPTH—AMER. STD.
0.760P = THREAD DEPTH—A.P.I. STD.
TOTAL TAPER ¾" PER FOOT
(MEASURED ON DIAMETER)

IMPERFECT THREADS DUE TO LEAD OR DIE



GAUGE TO GO ON FLUSH BY HAND
F = THICKNESS OF WORKING RING GAUGE



C = STRAIGHT PIPE THREAD PITCH DIA. FOR LOCKNUT CONNECTIONS

G = MINIMUM PITCH DIA. STRAIGHT FEMALE LOCKNUT THREAD

Nominal Pipe Size	Outside Diameter of Pipe	Threads Per Inch	Pitch of Thread	Pitch Diameter at Beginning of External Threads	Handtight Engagement		Effective Thread External		Wrench Make-Up Length for Internal Thread		Overall Length External Thread
					Length	Pitch Diameter	Length	Pitch Diameter	Length	Pitch Diameter	
	D	N	P	E_0	L_1‡	E_1	L_2†	E_2	L_3	E_3	L_4
⅛	.405	27	.0370	.3635	.180	.3748	.2639	.3800	.1111	.3566	.3924
¼	.540	18	.0556	.4774	.200	.4899	.4018	.5025	.1667	.4670	.5946
⅜	.675	18	.0556	.6120	.240	.6270	.4078	.6375	.1667	.6016	.6006
½	.840	14	.0714	.7584	.320	.7784	.5337	.7918	.2143	.7450	.7815
¾	1.050	14	.0714	.9677	.339	.9889	.5457	1.0018	.2143	.9543	.7935
1	1.315	11½	.0870	1.2136	.400	1.2386	.6828	1.2563	.2609	1.1973	.9845
1¼	1.660	11½	.0870	1.5571	.420	1.5834	.7068	1.6013	.2609	1.5408	1.0085
1½	1.900	11½	.0870	1.7961	.420	1.8223	.7235	1.8413	.2609	1.7798	1.0252
2	2.375	11½	.0870	2.2690	.436	2.2963	.7565	2.3163	.2609	2.2527	1.0582
2½	2.875	8	.1250	2.7195	.682	2.7622	1.1375	2.7906	.2500	2.7039	1.5712
3	3.500	8	.1250	3.3406	.766	3.3885	1.2000	3.4156	.2500	3.3250	1.6337
3½	4.000	8	.1250	3.8375	.821	3.8888	1.2500	3.9156	.2500	3.8219	1.6837
4	4.500	8	.1250	4.3344	.844	4.3871	1.3000	4.4156	.2500	4.3188	1.7337
* 4½	5.000	8	.1250	4.8313	.875	4.8859	1.3500	4.8418	- -	- -	- -
5	5.563	8	.1250	5.3907	.937	5.4493	1.4063	5.4786	.2500	5.3751	1.8400
6	6.625	8	.1250	6.4461	.958	6.5060	1.5125	6.5406	.2500	6.4305	1.9462
* 7	7.625	8	.1250	7.4398	1.000	7.5023	1.6125	7.4524	- -	- -	- -
8	8.625	8	.1250	8.4336	1.063	8.5000	1.7125	8.5406	.2500	8.4180	2.1462
* 9	9.625	8	.1250	9.4273	1.130	9.4980	1.8125	9.4415	- -	- -	- -
10	10.750	8	.1250	10.5453	1.210	10.6209	1.9250	10.6656	.2500	10.5297	2.3587
*11	11.750	8	.1250	11.5391	1.285	11.6194	2.0250	11.5549	- -	- -	- -
12	12.750	8	.1250	12.5328	1.360	12.6178	2.1250	12.6656	.2500	12.5172	2.5587
14	14.000	8	.1250	13.7750	1.562	13.8726	2.2500	13.9156	.2500	13.7594	2.6837
*15	15.000	8	.1250	14.7688	1.687	14.8742	2.3500	14.7872	- -	- -	- -
16	16.000	8	.1250	15.7625	1.812	15.8758	2.4500	15.9156	.2500	15.7469	2.8837
*17	17.000	8	.1250	16.7563	1.900	16.8750	2.5500	16.7762	- -	- -	- -
18	18.000	8	.1250	17.7500	2.000	17.8750	2.6500	17.9156	.2500	17.7344	3.0837
20	20.000	8	.1250	19.7375	2.125	19.8703	2.8500	19.9156	.2500	19.7219	3.2837
*22	22.000	8	.1250	21.7250	2.250	21.8656	3.0500	21.7488	- -	- -	- -
24	24.000	8	.1250	23.7125	2.375	23.8609	3.2500	23.9156	.2500	23.6969	3.6837

Data per American Standard ASA B2.1-1945 (for taper pipe threads) and API Standard 6A (for line pipe threads).

* Sizes discontinued in American Standards—listed for reference only.

† Also length of plug gauge.

‡ Length of ring gauge and length from gauging notch to small end of plug gauge.

The American Standard Pipe Thread and the API Standard Line Pipe Thread are interchangeable.

Allowable Working Pressures Tabulated

Seamless Carbon Steel GRADE B

Nominal Pipe Size	Maximum Allowable Working Pressures at -20F to 650F▲												
	Sched. 10■	Sched. 20	Sched. 30	Std. Wall	Sched. 40	Sched. 60	Extra Strong	Sched. 80	Sched. 100	Sched. 120	Sched. 140	Sched. 160	XX Strong
½	--	--	--	1694	1694	--	3036	3036	--	--	--	4551	9223
¾	659	--	--	1450	1450	--	2589	2589	--	--	--	4505	7531
1	1065	--	--	1578	1578	--	2601	2601	--	--	--	4290	7150
1¼	556	--	--	1069	1069	--	1941	1941	--	--	--	3001	5593
1½	486	--	--	1004	1004	--	1821	1821	--	--	--	3091	5114
2	388	--	--	903	903	--	1659	1659	--	--	--	3225	4475
2½	421	--	--	1214	1214	--	1936	1936	--	--	--	2963	4936
3	346	--	--	1094	1094	--	1773	1773	--	--	--	2933	4405
3½	303	--	--	1023	1023	--	1671	1671	--	--	--	--	--
4	269	--	--	974	974	--	1598	1598	--	2243	--	2868	3858
5	284	--	--	888	888	--	1475	1475	--	2123	--	2791	3485
6	239	--	--	833	833	--	1473	1473	--	2038	--	2738	3414
8	225	543	628	770	770	1038	1343	1343	1649	2068	2388	2715	2605
10	224	434	578	723	723	1070	1070	1311	1641	1975	2406	2754	--
12	219	366	534	630	696	1033	898	1305	1653	2009	2295	2735	--
14	333	451	573	573	693	999	816	1311	1690	2013	2341	2675	--
16	291	395	500	500	711	980	711	1305	1638	1975	2378	2669	--
18	258	350	538	444	725	1013	631	1303	1648	1998	2303	2665	--
20	233	399	568	399	693	995	568	1299	1653	1970	2338	2663	--
22	211	--	--	363	--	--	515	--	--	--	--	--	--
24	194	331	541	331	683	1004	471	1295	1664	2003	2309	2656	--
26	--	--	--	306	--	--	435	--	--	--	--	--	--
30	209	376	488	265	--	--	376	--	--	--	--	--	--
36	--	--	--	220	--	--	314	--	--	--	--	--	--
42	--	--	--	189	--	--	269	--	--	--	--	--	--

▲ For allowable working pressures at higher temperatures, multiply listed values by the following factors:

GRADE A

Temperature	700F	750F	800F	850F	900F
Multiplying Factor	.971	.892	.750	.708	.417

GRADE B

Temperature	700F	750F	800F	850F	900F
Multiplying Factor	.956	.863	.720	.520	.333

■ Schedule 10 starts with the 14" size. Values tabulated for smaller sizes refer to "Light Wall" fittings.

Pressure Temperature Ratings Of Flanges

Y STEELS ▲

Primary Service Pressure Rating		150 lb.	300 lb.	400 lb.	600 lb.	900 lb.	1500 lb.	2500 lb.
Hydrostatic Shell Test Pressures		425	1100	1450	2175	3250	5400	9000
Service Temperatures Degrees F.	Material	MAXIMUM, NON-SHOCK, SERVICE PRESSURE RATINGS, POUNDS PER SQUARE INCH (GAGE)						
—20 to 100△	*	275	720	960	1440	2160	3600	6000
150	*	255	710	945	1420	2130	3550	5915
200	*	240	700	930	1400	2100	3500	5830
250	*	225	690	920	1380	2070	3450	5750
300	*	210	680	910	1365	2050	3415	5690
350	*	195	675	900	1350	2025	3375	5625
400	*	180	665	890	1330	2000	3330	5550
450	*	165	650	870	1305	1955	3255	5430
500	*	150	625	835	1250	1875	3125	5210
550	*	140	590	790	1180	1775	2955	4925
600	*	130	555	740	1110	1660	2770	4620
650	*	120	515	690	1030	1550	2580	4300
700	Carbon Steel	110	470	635	940	1410	2350	3920
	Carbon Moly	110	480	640	960	1440	2400	4000
	½ Cr, ½ Mo	110	480	640	960	1440	2400	4000
	1 Cr, ½ Mo	110	485	645	965	1450	2415	4025
	1¼ Cr, ½ Mo	110	485	645	965	1450	2415	4025
	2 Cr, ½ Mo	110	480	640	960	1440	2400	4000
	2¼ Cr, 1 Mo	110	485	645	965	1450	2415	4025
	3 Cr, 1 Mo	110	480	640	960	1440	2400	4000
	5 Cr, ½ Mo	110	485	645	965	1450	2415	4025
	5 Cr, ½ Mo, Si	110	480	640	960	1440	2400	4000
	9 Cr, 1 Mo	110	485	645	965	1450	2415	4025

△ Some of the materials listed herein undergo a decrease in impact resistance to such an extent at subzero temperatures as to be unable to safely resist shock loading, sudden changes of stress, or high stress concentrations. Therefore, products that are to operate at temperatures of below —20F shall conform to the rules of the applicable Codes under which they are to be used.

* Includes all of the eleven materials rated for 700° service.

Pressure Temperature Ratings Of Flanges *(continued)*

CARBON AND ALLOY STEELS ▲

Primary Service Pressure Rating		150 lb.	300 lb.	400 lb.	600 lb.	900 lb.	1500 lb.	2500 lb.
Service Temperatures Degrees F.	Material	MAXIMUM, NON-SHOCK, SERVICE PRESSURE RATINGS, POUNDS PER SQUARE INCH (GAGE)						
750	Carbon Steel	100	425	575	850	1275	2125	3550
	Carbon Moly	100	445	590	890	1330	2220	3700
	½ Cr, ½ Mo	100	445	590	890	1330	2220	3700
	1 Cr, ½ Mo	100	450	600	900	1350	2250	3745
	1¼ Cr, ½ Mo	100	450	600	900	1350	2250	3745
	2 Cr, ½ Mo	100	445	590	890	1330	2220	3700
	2¼ Cr, 1 Mo	100	450	600	900	1350	2250	3745
	3 Cr, 1 Mo	100	445	590	890	1330	2220	3700
	5 Cr, ½ Mo	100	450	600	900	1350	2250	3745
	5 Cr, ½ Mo, Si	100	445	590	890	1330	2220	3700
	9 Cr, 1 Mo	100	450	600	900	1350	2250	3745
800	Carbon Steel	92	365	490	730	1100	1830	3050
	Carbon Moly	92	410	545	815	1225	2040	3400
	½ Cr, ½ Mo	92	410	545	815	1225	2040	3400
	1 Cr, ½ Mo	92	415	555	835	1250	2080	3470
	1¼ Cr, ½ Mo	92	415	555	835	1250	2080	3470
	2 Cr, ½ Mo	92	410	545	815	1225	2040	3400
	2¼ Cr, 1 Mo	92	415	555	835	1250	2080	3470
	3 Cr, 1 Mo	92	410	545	815	1225	2040	3400
	5 Cr, ½ Mo	92	415	555	835	1250	2080	3470
	5 Cr, ½ Mo, Si	92	410	545	815	1225	2040	3400
	9 Cr, 1 Mo	92	415	555	835	1250	2080	3470
850	Carbon Steel	82	300	400	600	900	1500	2500
	Carbon Moly	82	370	495	745	1115	1860	3100
	½ Cr, ½ Mo	82	370	495	745	1115	1860	3100
	1 Cr, ½ Mo	82	385	510	765	1150	1915	3190
	1¼ Cr, ½ Mo	82	385	510	765	1150	1915	3190
	2 Cr, ½ Mo	82	370	495	745	1115	1860	3100
	2¼ Cr, 1 Mo	82	385	510	765	1150	1915	3190
	3 Cr, 1 Mo	82	370	495	745	1115	1860	3100
	5 Cr, ½ Mo	82	385	510	765	1150	1915	3190
	5 Cr, ½ Mo, Si	82	370	495	745	1115	1860	3100
	9 Cr, 1 Mo	82	385	510	765	1150	1915	3190
875	Carbon Steel	75	260	350	525	785	1305	2180
	Carbon Moly	75	355	470	710	1060	1770	2950
	½ Cr, ½ Mo	75	355	470	710	1060	1770	2950
	1 Cr, ½ Mo	75	365	490	735	1100	1830	3055
	1¼ Cr, ½ Mo	75	365	490	735	1100	1830	3055
	2 Cr, ½ Mo	75	355	470	710	1060	1770	2950
	2¼ Cr, 1 Mo	75	365	490	735	1100	1830	3055
	3 Cr, 1 Mo	75	355	470	710	1060	1770	2950
	5 Cr, ½ Mo	75	365	490	735	1100	1830	3055
	5 Cr, ½ Mo, Si	75	355	470	710	1060	1770	2950
	9 Cr, 1 Mo	75	365	490	735	1100	1830	3055
900	Carbon Steel	70	225	295	445	670	1115	1855
	Carbon Moly	70	335	450	670	1010	1680	2800
	½ Cr, ½ Mo	70	335	450	670	1010	1680	2800
	1 Cr, ½ Mo	70	350	465	700	1050	1750	2915
	1¼ Cr, ½ Mo	70	350	465	700	1050	1750	2915
	2 Cr, ½ Mo	70	335	450	670	1010	1680	2800
	2¼ Cr, 1 Mo	70	350	465	700	1050	1750	2915
	3 Cr, 1 Mo	70	335	450	670	1010	1680	2800
	5 Cr, ½ Mo	70	350	465	700	1050	1750	2915
	5 Cr, ½ Mo, Si	70	335	450	670	1010	1680	2800
	9 Cr, 1 Mo	70	350	465	700	1050	1750	2915

Pressure Temperature Ratings Of Flanges *(continued)*

CARBON AND ALLOY STEELS ▲

Primary Service Pressure Rating		150 lb.	300 lb.	400 lb.	600 lb.	900 lb.	1500 lb.	2500 lb.
Service Temperatures Degrees F.	Material	MAXIMUM, NON-SHOCK, SERVICE PRESSURE RATINGS, POUNDS PER SQUARE INCH (GAGE)						
925	Carbon Steel	60	190	250	375	565	945	1570
	Carbon Moly	60	320	425	635	955	1590	2650
	½ Cr, ½ Mo	60	320	425	635	955	1590	2650
	1 Cr, ½ Mo	60	335	445	665	1000	1665	2775
	1¼ Cr, ½ Mo	60	335	445	665	1000	1665	2775
	2 Cr, ½ Mo	60	320	425	635	955	1590	2650
	2¼ Cr, 1 Mo	60	335	445	665	1000	1665	2775
	3 Cr, 1 Mo	60	320	425	635	955	1590	2650
	5 Cr, ½ Mo	60	335	445	665	1000	1665	2775
	5 Cr, ½ Mo, Si	60	320	425	635	955	1590	2650
	9 Cr, 1 Mo	60	335	445	665	1000	1665	2775
950	Carbon Steel	55	155	205	310	465	770	1285
	Carbon Moly	55	300	400	600	900	1500	2500
	½ Cr, ½ Mo	55	300	400	600	900	1500	2500
	1 Cr, ½ Mo	55	315	420	635	950	1585	2640
	1¼ Cr, ½ Mo	55	315	420	635	950	1585	2640
	2 Cr, ½ Mo	55	300	400	600	900	1500	2500
	2¼ Cr, 1 Mo	55	315	420	635	950	1585	2640
	3 Cr, 1 Mo	55	300	400	600	900	1500	2500
	5 Cr, ½ Mo	55	315	420	635	950	1585	2640
	5 Cr, ½ Mo, Si	55	300	400	600	900	1500	2500
	9 Cr, 1 Mo	55	315	420	635	950	1585	2640
975	Carbon Steel	50	120	160	240	360	600	1000
	Carbon Moly	50	280	370	555	835	1395	2320
	½ Cr, ½ Mo	50	280	370	555	835	1395	2320
	1 Cr, ½ Mo	50	300	400	600	900	1500	2500
	1¼ Cr, ½ Mo	50	300	400	600	900	1500	2500
	2 Cr, ½ Mo	50	280	370	555	835	1390	2315
	2¼ Cr, 1 Mo	50	300	400	600	900	1500	2500
	3 Cr, 1 Mo	50	275	365	550	825	1370	2285
	5 Cr, ½ Mo	50	300	400	600	900	1500	2500
	5 Cr, ½ Mo, Si	50	250	330	495	745	1245	2070
	9 Cr, 1 Mo	50	300	400	600	900	1500	2500
1000	Carbon Steel	40	85	115	170	255	430	715
	Carbon Moly	40	215	285	430	645	1070	1785
	½ Cr, ½ Mo	40	215	285	430	645	1070	1785
	1 Cr, ½ Mo	40	255	345	515	770	1285	2145
	1¼ Cr, ½ Mo	40	265	355	535	800	1335	2230
	2 Cr, ½ Mo	40	215	285	425	635	1065	1770
	2¼ Cr, 1 Mo	40	265	355	535	800	1335	2230
	3 Cr, 1 Mo	40	240	320	480	720	1200	2000
	5 Cr, ½ Mo	40	250	335	500	750	1250	2085
	5 Cr, ½ Mo, Si	40	190	250	375	565	945	1570
	9 Cr, 1 Mo	40	290	390	585	875	1455	2430
1025	1 Cr, ½ Mo	- -	215	285	430	645	1070	1785
	1¼ Cr, ½ Mo	- -	230	305	455	685	1140	1900
	2 Cr, ½ Mo	- -	180	240	355	535	890	1485
	2¼ Cr, 1 Mo	- -	235	310	465	700	1165	1945
	3 Cr, 1 Mo	- -	215	285	430	645	1070	1785
	5 Cr, ½ Mo	- -	215	285	430	645	1070	1785
	5 Cr, ½ Mo, Si	- -	155	205	310	465	770	1285
	9 Cr, 1 Mo	- -	240	320	480	720	1200	2000

Pressure Temperature Ratings Of Flanges *(continued)*

CARBON AND ALLOY STEELS▲

Primary Service Pressure Rating		150 lb.	300 lb.	400 lb.	600 lb.	900 lb.	1500 lb.	2500 lb.
Service Temperatures Degrees F.	Material	MAXIMUM, NON-SHOCK, SERVICE PRESSURE RATINGS, POUNDS PER SQUARE INCH (GAGE)						
1050	1 Cr, ½ Mo	- -	170	230	345	515	855	1430
	1¼ Cr, ½ Mo	- -	190	250	375	565	945	1570
	2 Cr, ½ Mo	- -	145	190	290	430	720	1200
	2¼ Cr, 1 Mo	- -	200	265	400	595	995	1655
	3 Cr, 1 Mo	- -	190	250	375	565	945	1570
	5 Cr, ½ Mo	- -	180	240	355	535	890	1485
	5 Cr, ½ Mo, Si	- -	120	160	240	360	600	1000
	9 Cr, 1 Mo	- -	190	250	375	565	945	1570
1075	1 Cr, ½ Mo	- -	135	180	265	400	670	1115
	1¼ Cr, ½ Mo	- -	165	215	325	490	815	1355
	2 Cr, ½ Mo	- -	120	160	240	355	595	995
	2¼ Cr, 1 Mo	- -	170	230	345	515	855	1430
	3 Cr, 1 Mo	- -	165	215	325	490	815	1355
	5 Cr, ½ Mo	- -	145	195	290	435	730	1215
	5 Cr, ½ Mo, Si	- -	105	135	205	310	515	855
	9 Cr, 1 Mo	- -	150	200	300	455	755	1255
1100	1 Cr, ½ Mo	- -	95	130	190	290	480	800
	1¼ Cr, ½ Mo	- -	135	185	275	410	685	1145
	2 Cr, ½ Mo	- -	95	125	190	285	470	785
	2¼ Cr, 1 Mo	- -	145	190	290	430	720	1200
	3 Cr, 1 Mo	- -	135	185	275	410	685	1145
	5 Cr, ½ Mo	- -	115	150	225	340	565	945
	5 Cr, ½ Mo, Si	- -	85	115	170	255	430	715
	9 Cr, 1 Mo	- -	115	150	225	340	565	945
1125	1 Cr, ½ Mo	- -	75	100	150	225	375	620
	1¼ Cr, ½ Mo	- -	110	150	225	335	555	930
	2 Cr, ½ Mo	- -	75	105	155	230	385	645
	2¼ Cr, 1 Mo	- -	125	165	245	370	615	1030
	3 Cr, 1 Mo	- -	115	155	230	345	575	955
	5 Cr, ½ Mo	- -	95	125	190	285	470	785
	5 Cr, ½ Mo, Si	- -	75	100	145	220	370	615
	9 Cr, 1 Mo	- -	95	125	190	285	470	785
1150	1 Cr, ½ Mo	- -	55	70	105	160	265	445
	1¼ Cr, ½ Mo	- -	85	115	170	255	430	715
	2 Cr, ½ Mo	- -	60	80	120	180	300	500
	2¼ Cr, 1 Mo	- -	105	135	205	310	515	855
	3 Cr, 1 Mo	- -	95	125	185	280	465	770
	5 Cr, ½ Mo	- -	75	100	150	225	375	630
	5 Cr, ½ Mo, Si	- -	60	80	125	185	310	515
	9 Cr, 1 Mo	- -	75	100	150	225	375	630
1175	1 Cr, ½ Mo	- -	45	60	85	130	220	365
	1¼ Cr, ½ Mo	- -	65	85	125	190	315	530
	2 Cr, ½ Mo	- -	50	65	100	150	255	420
	2¼ Cr, 1 Mo	- -	85	115	170	255	430	715
	3 Cr, 1 Mo	- -	70	95	145	215	360	600
	5 Cr, ½ Mo	- -	65	85	125	190	315	530
	5 Cr, ½ Mo, Si	- -	50	70	105	155	255	430
	9 Cr, 1 Mo	- -	65	85	125	190	315	530
1200	1 Cr, ½ Mo	- -	35	45	70	105	170	285
	1¼ Cr, ½ Mo	- -	40	55	80	125	205	345
	2 Cr, ½ Mo	- -	40	55	80	125	205	345
	2¼ Cr, 1 Mo	- -	70	90	135	205	345	570
	3 Cr, 1 Mo	- -	50	70	105	155	255	430
	5 Cr, ½ Mo	- -	50	70	105	155	255	430
	5 Cr, ½ Mo, Si	- -	40	55	80	125	205	345
	9 Cr, 1 Mo	- -	50	70	105	155	255	430

ANSI B36.10 API Std. 5L

Nominal Wall Thicknesses For All Schedules (with -12.5% values) Number in ( ) in Wall Thickness Column is Minimum Wall.

		Sch. 5		Sch. 10		Gas Dist.		Sch. 20		STD.		Sch. 30		Sch. 40		XS	
Nom. Size	Nom. OD	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall
1/8	.405									.269	.068 (.060)				STD.	.215	.095 (.083)
1/4	.540									.364	.088 (.077)				STD.	.302	.119 (.104)
3/8	.675									.493	.091 (.080)				STD.	.423	.126 (.110)
1/2	.840									.622	.109 (.096)				STD.	.546	.147 (.129)
3/4	1.050	.920	.065 (.057)	.884	.083 (.073)					.824	.113 (.099)				STD.	.742	.154 (.135)
1	1.315	1.185	.065 (.057)	1.097	.109 (.095)					1.049	.133 (.116)				STD.	.957	.179 (.157)
1 1/4	1.660	1.530	.065 (.057)	1.442	.109 (.095)					1.380	.140 (.122)				STD.	1.278	.191 (.167)
1 1/2	1.900	1.770	.065 (.057)	1.682	.109 (.095)					1.610	.145 (.127)				STD.	1.500	.200 (.175)
2	2.375	2.245	.065 (.057)	2.157	.109 (.095)					2.067	.154 (.135)				STD.	1.939	.218 (.191)
2 1/2	2.875	2.709	.083 (.073)	2.635	.120 (.105)					2.469	.203 (.178)				STD.	2.323	.276 (.242)
3	3.500	3.334	.083 (.073)	3.260	.120 (.105)					3.068	.216 (.189)				STD.	2.900	.300 (.262)
3 1/2	4.000	3.834	.083 (.073)	3.760	.120 (.105)					3.548	.226 (.198)				STD.	3.364	.318 (.278)
4	4.500	4.334	.083 (.073)	4.260	.120 (.105)	4.124	.188 (.164)			4.026	.237 (.207)				STD.	3.826	.337 (.295)
5	5.563	5.345	.109 (.095)	5.295	.134 (.117)					5.047	.258 (.226)				STD.	4.813	.375 (.328)
6	6.625	6.407	.109 (.095)	6.357	.134 (.117)	6.187	.219 (.192)			6.065	.280 (.245)				STD.	5.761	.432 (.378)
8	8.625	8.407	.109 (.095)	8.329	.148 (.130)	8.187	.219 (.192)	8.125	.250 (.219)	7.981	.322 (.282)	8.071	.277 (.242)		STD.	7.625	.500 (.438)
10	10.750	10.482	.134 (.117)	10.420	.165 (.144)	10.312	.219 (.192)	10.250	.250 (.219)	10.020	.365 (.319)	10.136	.307 (.269)		STD.	9.750	.500 (.438)
12	12.750	12.438	.156 (.136)	12.390	.180 (.158)	12.250	.250 (.219)	12.250	.250 (.219)	12.000	.375 (.328)	12.090	.330 (.289)	11.938	.406 (.355)	11.750	.500 (.438)
14	14.000			13.500	.250 (.219)	13.500	.250 (.219)	13.376	.312 (.273)	13.250	.375 (.328)		STD.	13.124	.438 (.383)	13.000	.500 (.438)
16	16.000			15.500	.250 (.219)	15.500	.250 (.219)	15.376	.312 (.273)	15.250	.375 (.328)		STD.		XS	15.000	.500 (.438)
18	18.000			17.500	.250 (.219)	17.500	.250 (.219)	17.376	.312 (.273)	17.250	.375 (.328)	17.124	.438 (.383)	16.876	.562 (.492)	17.000	.500 (.438)
20	20.000			19.500	.250 (.219)	19.500	.250 (.219)		STD	19.250	.375 (.328)		XS	18.812	.594 (.519)	19.000	.500 (.438)
22	22.000			21.500	.250 (.219)				STD	21.250	.375 (.328)		XS			21.000	.500 (.438)
24	24.000			23.500	.250 (.219)	23.500	.250 (.219)		STD	23.250	.375 (.328)	22.876	.562 (.492)	22.674	.688 (.602)	23.000	.500 (.438)
26	26.000			25.376	.312 (.273)				XS	25.250	.375 (.328)					25.000	.500 (.438)
28	28.000			27.376	.312 (.273)				XS	27.250	.375 (.328)	26.750	.625 (.547)			27.000	.500 (.438)
30	30.000			29.376	.312 (.273)				XS	29.250	.375 (.328)	28.750	.625 (.547)			29.000	.500 (.438)
32	32.000			31.376	.312 (.273)				XS	31.250	.375 (.328)	30.750	.625 (.547)	30.624	.688 (.602)	31.000	.500 (.438)
34	34.000			33.376	.312 (.273)				XS	33.250	.375 (.328)	32.750	.625 (.547)	32.624	.688 (.602)	33.000	.500 (.438)
36	36.000			35.376	.312 (.273)				XS	35.250	.375 (.328)	34.750	.625 (.547)	34.500	.750 (.656)	35.000	.500 (.438)
38	38.000									37.250	.375 (.328)						.500 (.438)
40	40.000									39.250	.375 (.328)						.500 (.438)
42	42.000									41.250	.375 (.328)	40.750	.625 (.547)	40.500		41.000	.500 (.438)
44	44.000									43.250	.375 (.328)					43.000	.500 (.438)
46	46.000									45.250	.375 (.328)					45.000	.500 (.438)
48	48.000									47.250	.375 (.328)					47.000	.500 (.438)

ANSI B36.10 API Std. 5L

Nominal Wall Thicknesses For All Schedules (with -12.5% values) Number in ( ) in Wall Thickness Column is Minimum Wall.

		Sch. 60		Sch. 80		Sch.100		Sch. 120		Sch. 140		Sch. 160		XXS		API	
Nom. Size	Nom. OD	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall	ID	Wall
1/8	.405			XS													
1/4	.540			XS													
3/8	.675			XS													
1/2	.840			XS								.464	.188 (.165)	.252	.294 (.257)		
3/4	1.050			XS								.612	.219 (.192)	.434	.308 (.280)		
1	1.315			XS								.815	.250 (.219)	.599	.358 (.313)		
1 1/4	1.660			XS								1.160	.250 (.219)	.896	.382 (.334)		
1 1/2	1.900			XS								1.338	.281 (.246)	1.100	.400 (.350)		
2	2.375			XS								1.687	.344 (.301)	1.503	.436 (.382)		
2 1/2	2.875			XS								2.125	.375 (.328)	1.771	.552 (.483)		
3	3.500			XS								2.624	.438(.383)	2.300	.600 (.525)	3.250	.125 (.109)
3 1/2	4.000			XS										2.728[1]	.636 (.557)[1]		
4	4.500			XS				3.624	.438 (.383)			3.438	.531 (.465)	3.152	.674 (.590)	4.250	.125 (.109)
5	5.563			XS				4.563	.500 (.438)			4.313	.625 (.547)	4.063	.750 (.656)		
6	6.625			XS				5.501	.562 (.492)			5.187	.719 (.629)	4.897	.864 (.756)	63.313[2]	.156 (.136)
8	8.625	7.813	.406 (.355)	XS		7.437	.594 (.520)	7.187	.719 (.629)	7.001	.812 (.710)	6.813	.906 (.793)	6.875	.875 (.766)	8.281[2]	.172 (.150)
10	10.750	XS		9.562	.594 (.520)	9.312	.719 (.629)	9.062	.844 (.739)	8.750	1.000 (.875)	8.500	1.125 (.984)	SCH 140		10.374	.188 (.164)
12	12.750	11.626	.562 (.492)	11.374	.688 (.602)	11.062	.844 (.738)	10.750	1.000 (.875)	10.500	1.125 (.984)	10.126	1.312 (1.148)	SCH 120		12.344	.203 (.178)
14	14.000	12.812	.594 (.520)	12.500	.750 (.656)	12.124	.938 (.821)	11.812	1.094 (.957)	11.500	1.250 (1.094)	11.188	1.406 (1.230)				
16	16.000	14.688	.656 (.574)	14.312	.844 (.739)	13.938	1.031 (.902)	13.562	1.219 (1.067)	13.124	1.438 (1.258)	12.812	1.594 (1.395)				
18	18.000	16.500	.750 (.656)	16.124	.938 (.821)	15.688	1.156 (1.012)	15.250	1.375 (1.203)	14.876	1.562 (1.367)	14.438	1.781 (1.558)				
20	20.000	18.376	.812 (.711)	17.938	1.031 (.902)	17.438	1.281 (1.121)	17.000	1.500 (1.312)	16.500	1.750 (1.531)	16.062	1.969 (1.723)				
22	22.000	20.250	.875 (.766)	19.750	1.125 (.984)	19.250	1.375 (1.203)	18.750	1.625 (1.422)	18.250	1.875 (1.641)	17.750	2.125 (1.859)				
24	24.000	22.062	.969 (.848)	21.562	1.219 (1.067)	20.938	1.531 (1.340)	20.376	1.812 (1.586)	19.876	2.062 (1.804)	19.312	2.344 (2.051)				
26	26.000																
28	28.000																
30	30.000																
32	32.000																
34	34.000																
36	36.000																
38	38.000																
40	40.000																
42	42.000																
44	44.000																
46	46.000																
48	48.000																

[1] Not in ANSI B36.10
[2] Not in API

These Spaces have been provided so that new pipe size can be included as they become available

Decimal & Metric Equivalents to Fractions API vs Flange Dimensions

Decimal & Metric Equivalents to Fractions

Fractions			DECIMAL	MM
		1/64	.01562	0.397
	1/32		.03125	0.794
		3/64	.04687	1.191
1/16			.0625	1.588
		5/64	.07812	1.984
	3/32		.09375	2.381
		7/64	.10937	2.778
1/8			.1250	3.175
		9/64	.14062	3.572
	5/32		.15625	3.969
		11/64	.17187	4.366
3/16			.1875	4.763
		13/64	.20312	5.159
	7/32		.21875	5.556
		15/64	.23437	5.953
1/4			.2500	6.350
		17/64	.26562	6.747
	9/32		.28125	7.144
		19/64	.29687	7.541
5/16			.3125	7.938
		21/64	.32812	8.334
	11/32		.34375	8.731
		23/64	.35937	9.128
3/8			.3750	9.525
		25/64	.39062	9.922
	13/32		.40625	10.319
		27/64	.42187	10.716
7/16			.4375	11.113
		29/64	.45312	11.509
	15/32		.46875	11.906
		31/64	.48437	12.303
1/2			.5000	12.700
		33/64	.51562	13.097
	17/32		.53125	13.494
		35/64	.54687	13.891
9/16			.5625	14.288
		37/64	.57812	14.684
	19/32		.59375	15.081
		39/64	.60937	15.478
5/8			.6250	15.875
		41/64	.64062	16.272
	21/32		.65625	16.669
		43/64	.67187	17.066
11/16			.6875	17.463
		45/64	.70312	17.859
	23/32		.71875	18.256
		47/64	.73437	18.653
3/4			.76562	19.050
		49/64	.76562	19.447
	25/32		.78125	19.844
		51/64	.79687	20.241
13/16			.8125	20.638
		53/64	.82812	21.034
	27/32		.84375	21.431
		55/64	.85937	21.828
7/8			.8750	22.225
		57/64	.89062	22.622
	29/32		.90625	23.019
		59/64	.92187	23.416
15/16			.9375	23.812
		61/64	.95312	24.209
	31/32		.96875	24.606
		63/64	.98437	25.003
1			1.0000	25.400

API vs ANSI Flange Dimensions

	Pressure Class Designation		Nominal Size Range	
Flange Type	ANSI	API	ANSI	API
Welding Neck	600	2000	1/2 - 10	1 13/16 - 11
	900	3000	1/2 - 10	1 13/16 - 11
	1500	5000	1/2 - 10	1 13/16 - 11
Blind, Threaded, & Integral [1]	600	2000	1/2 - 20	1 13/16 - 21 1/4
	900	3000	1/2 - 20	1 13/16 - 20 3/4
	1500	5000	1/2 - 20	1 13/16 - 11

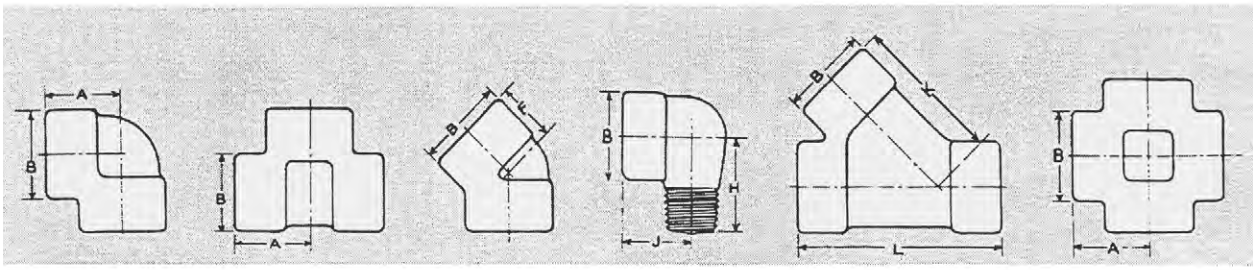
Forged Steel

DIMENSIONS (Inches)

	NOMINAL PIPE SIZE	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	4
Class 2000	A		7/8	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 3/8	3	3 3/8	4 1/16
	B		29/32	1 1/16	1 5/16	1 9/16	1 27/32	2 7/32	2 1/2	3 1/32	3 11/16	4 1/16	5 3/4
	F		3/4	3/4	1	1 1/8	1 1/4	1 5/16	1 3/8	1 11/16	2 1/16	2 1/2	3 1/8
Class 3000	A	7/8	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 3/8	2 1/2	3 1/4	3 3/4	4 1/2
	B	29/32	1 1/16	1 5/16	1 5/16	1 27/32	2 7/32	2 1/2	3 1/32	3 11/32	4	4 3/4	6
	F	3/4	3/4	1	1 1/8	1 1/4	1 5/16	1 3/8	1 11/16	1 3/4	2 1/16	2 1/2	3 1/8
	H	1 1/4	1 1/4	1 1/2	1 5/8	1 7/8	2 1/4	2 5/8	2 15/16	3 5/16			
	J	1/8	7/8	1	1 1/8	1 3/8	1 3/4	2	2 1/8	2 1/2			
	K		1 7/8	2 1/8	2 5/16	3	3 1/2	3 15/16	4 1/4	5			
	L		2 11/16	3	3 5/16	4 1/8	4 1/16	5 3/8	6 1/16	6 5/8			
Class 6000	A	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 3/8	2 1/2	3 1/4	3 3/4	4 1/16	4 1/2
	B	1 1/16	1 5/16	1 5/16	1 27/32	2 7/32	2 1/2	3 1/32	3 11/32	4	4 3/4	5 3/4	6
	F	3/4	1	1 1/8	1 1/4	1 5/16	1 3/8	1 11/16	1 3/4	2 1/16	2 1/2	3 1/8	3 1/8
	H	1 1/4	1 1/2	1 5/8	1 7/8	2 1/4	2 5/8	2 15/16	3 5/16				
	J	7/8	1	1 1/8	1 3/8	1 3/4	2	2 1/8	2 1/2				
	K			2 5/16	3	3 1/2	3 15/16	4 3/4	5				
	L			3 5/16	4 1/8	4 13/16	5 3/8	6 7/16	6 5/8				

WEIGHTS (Pounds)

Class 2000	90° ELBOW	.25	.198	.283	.500	.773	1.013	1.550	2.180	3.140	6.50	10.925	26.675
	45° ELBOW	.125	.188	.236	.435	.740	1.058	1.375	1.740	2.883	7.75	11.313	19.125
	TEE	.25	.267	.373	.613	.963	1.355	2.030	2.800	4.456	9.530	12.908	28.700
	CROSS	.50	.50	.460	.777	1.125	1.688	2.450	3.188	5.560	16.438	19.50	32.688
Class 3000	90° ELBOW	.236	.350	.592	.973	1.355	2.265	2.407	3.50	5.920	11.900	14.438	31.975
	45° ELBOW	.25	.290	.50	.75	1.188	1.988	2.235	3.00	4.930	7.375	13.558	19.063
	TEE	.325	.460	.753	1.270	1.830	3.025	3.620	7.040	7.550	13.125	23.100	40.000
	STREET ELBOW	.264	.242	.375	.595	1.048	1.438	2.340	3.00	5.461			
	LATERAL		.625	1.313	1.75	2.75	4.625	5.50	10.813				
	CROSS	.438	.567	.970	1.50	2.50	3.620	4.125	6.50	8.125	16.75	25.675	32
Class 6000	90° ELBOW	.25	.625	1.023	1.625	2.625	3.50	6.75	7.50	13.438	20.875	39.050	38
	45° ELBOW	.25	.640	.50	1.438	2.188	2.785	4.688	5.75	9.50	15	30.563	29
	TEE	.50	.853	1.410	2.150	3.563	4.625	7.625	9.625	16.500	28.063	47.500	50
	STREET ELBOW		.375	.438	1	1.625	3.030	3.688	7.120				
	LATERAL			2.375	3.25	5.438	7.188	12.313					
	CROSS	.563	1.188	1.50	2.75	4.313	6.625	10.75	11.50	22.188	27.50	54	43.50



Threaded Couplings, Reducers & Caps– Class 3000 & 6000

DIMENSIONS (Inches)

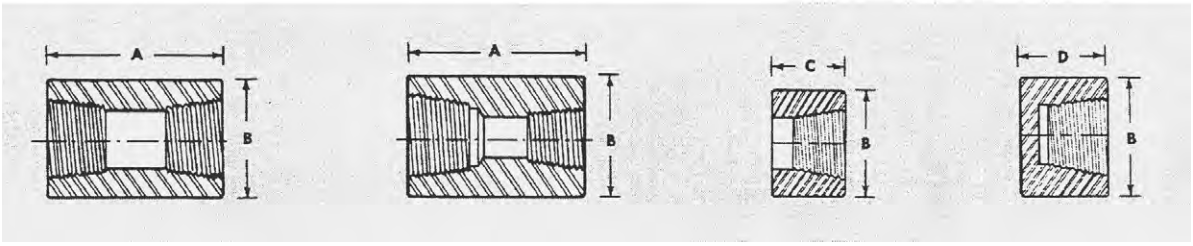
	NOMINAL PIPE SIZE	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Class 3000	A	1 1/4	1 3/8	1 1/2	1 7/8	2	2 3/8	2 5/8	3 1/8	3 3/8	3 5/8	4 1/4	4 3/4
	B	3/4	3/4	7/8	1 1/8	1 3/8	1 3/4	2 1/4	2 1/2	3	3 5/8	4 1/4	5 1/2
	C	5/8	11/16	3/4	15/16	1	1 3/16	1 5/16	1 9/16	1 11/16	1 13/16	2 1/8	2 3/8
	D	15/16	1	1	1 1/4	1 7/16	1 5/8	1 3/4	1 3/4	1 7/8	2 3/8	2 9/16	2 11/16

Class 6000	A	1 1/4	1 3/8	1 1/2	1 7/8	2	2 3/8	2 5/8	3 1/8	3 3/8	3 5/8	4 1/4	4 3/4
	B	7/8	1	1 1/4	1 1/2	1 3/4	2 1/4	2 1/2	3	3 5/8	4 1/4	5	6 1/4
	C	5/8	11/16	3/4	15/16	1	1 3/16	1 5/16	1 9/16	1 11/16	1 13/16	2 1/8	2 3/8
	D	1	1 1/16	1 1/16	1 5/16	1 1/2	1 11/16	1 13/16	1 7/8	2	2 1/2	2 11/16	2 15/16

WEIGHTS (Pounds)

Class 3000	COUPLING	.125	.125	.25	.25	.438	.625	1.563	2.188	3.125	4	6.75	16.75
	REDUCER	.125	.125	.25	.25	.438	.625	1.563	2.188	3.125	4	6.75	16.75
	HALF COUPLING	.063	.063	.188	.188	.25	.313	.75	1.125	1.563	2	3.375	8.375
	PIPE CAP	.031	.063	.125	.25	.313	.50	1	1.625	3.125	5	8.50	14

Class 6000	COUPLING	.188	.188	.25	.50	1	2.125	2.375	4.375	7.75	10.75	13.50	24.50
	REDUCER	.188	.188	.25	.50	1	2.125	2.375	4.375	7.75	10.75	13.50	24.50
	HALF COUPLING	.094	.094	.125	.25	.50	1.063	1.188	2.188	3.875	5.375	6.75	12.25
	PIPE CAP	.125	.125	.188	.313	.438	.75	1.313	1.688	3.25			

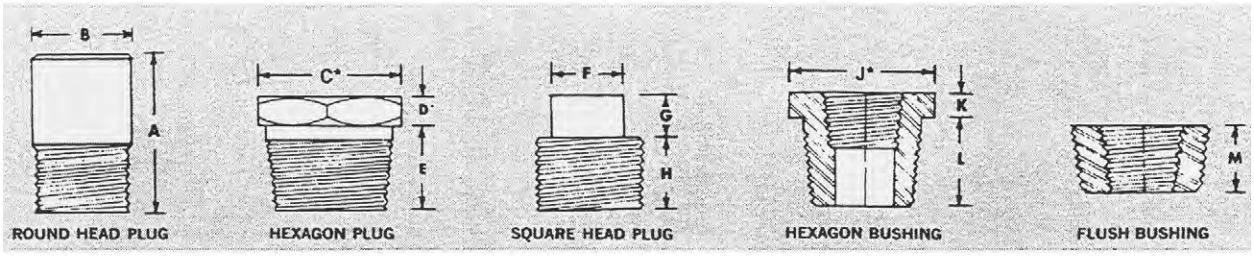


DIMENSIONS (Inches)

NOMINAL PIPE SIZE	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
A	1 3/8	1 5/8	1 5/8	1 3/4	1 3/4	2	2	2	2 1/2	2 3/4	2 3/4	3
B	13/32	17/32	11/16	27/32	1 1/16	1 5/16	1 11/16	1 29/32	2 3/8	2 7/8	3 1/2	4 1/2
C*	7/16	5/8	11/16	7/8	1 1/16	1 7/16	1 13/16	2	2 1/2	3	3 3/4	4 5/8
D	1/4	1/4	5/16	5/16	3/8	3/8	9/16	5/8	11/16	3/4	13/16	1 1/4
E	7/16	1/2	9/16	11/16	3/4	27/32	7/8	15/16	1	1 1/4	1 9/16	1 21/32
F	9/32	3/8	7/16	9/16	5/8	13/16	15/16	1 1/8	1 5/16	1 1/2	1 11/16	2 1/2
G	1/4	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	1 1/4
H	3/8	7/16	1/2	9/16	5/8	3/4	13/16	13/16	7/8	1 1/16	1 1/8	1 3/8
J*		5/8	11/16	7/8	1 1/16	1 7/16	1 13/16	2	2 1/2	3	3 3/4	4 5/8
K		3/16	3/16	3/16	1/4	1/4	3/8	3/8	3/8	1/2	13/16	1 1/4
L		1/2	9/16	11/16	3/4	27/32	7/8	15/16	1	1 1/4	1 9/16	1 21/32
M		7/16	1/2	9/16	5/8	3/4	13/16	13/16	7/8	1 1/16	1 1/8	1 1/4
N	3/8	7/16	1/2	9/16	5/8	3/4	13/16	13/16	7/8	1 1/16	1 1/8	1 1/4

WEIGHTS (Pounds)

ROUND HEAD PLUGS	.125	.125	.188	.250	.375	.750	1.125	1.563	3.00	4.75	7.62	12.87
HEXAGON PLUGS	.063	.063	.125	.188	.313	.500	1.125	1.375	2.25	3.87	5.87	13.00
SQUARE HEAD PLUGS	.016	.031	.063	.125	.188	.313	.563	.875	1.50	2.25	2.87	7.18
HEXAGON BUSHINGS		.063	.063	.063	.125	.188	.375	.688	1.62	2.37	3.50	8.31
FLUSH BUSHINGS		.063	.063	.063	.125	.125	.125	.188	.37	.62	1.00	2.00



*Dimension J for Hex Head Bushing and dimension C for Hex Head Plug are the same.

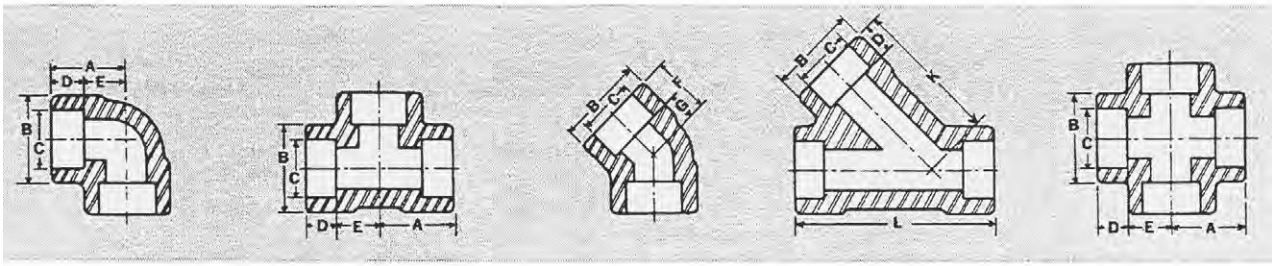
DIMENSIONS (Inches)

	NOMINAL PIPE SIZE	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Class 3000 Schedule 40 Bore	A	7/8	7/8	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 3/8	3	3 3/8	4 3/16
	B	29/32	29/32	1 1/16	1 5/16	1 3/16	1 29/32	2 9/32	2 1/2	3 1/32	3 11/16	4 5/16	5 3/4
	D	7/16	7/16	7/16	1/2	9/16	5/8	11/16	3/4	7/8		1 3/8	1 1/8	1 5/16
	E	7/16	7/16	17/32	5/8	3/4	7/8	1 1/16	1 1/4	1 1/2	1 3/8	2 1/4	2 5/8
	F	3/4	3/4	3/4	1	1 1/8	1 1/4	1 5/16	1 3/8	1 11/16	2 1/16	2 1/2	3 1/8
	G	5/16	5/16	5/16	7/16	1/2	9/16	11/16	13/16	1	1 1/8	1 1/4	1 5/8
	H	1 1/4	1 1/4	1 1/2	1 7/8	1 7/8	2 1/4	2 5/8	2 15/16	3 5/16			
	J	7/8	7/8	1	1 1/8	1 1/8	1 1/4	2	2 1/8	2 1/2			
	K			1 7/8	2 1/8	2 5/16	3	3 1/2	3 15/16	4 3/4			
	L			2 11/16	3	3 5/16	4 1/8	4 13/16	5 3/8	6 5/16			

	NOMINAL PIPE SIZE	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Class 6000 Schedule 160 Bore	A	7/8	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 3/8	2 1/2	3 1/4	3 3/4	4 1/2
	B	29/32	1 1/16	1 5/16	1 5/16	1 29/32	2 5/32	2 1/2	3 1/32	3 11/32	4	4 3/4	6
	D	7/16	7/16	1/2	9/16	5/8	11/16	3/4	7/8	7/8	1	1 1/4	1 3/4
	E	7/16	17/32	5/8	3/4	7/8	1 1/16	1 1/4	1 1/2	1 5/8	2 1/4	2 1/2	2 3/4
	F	3/4	3/4	1	1 1/8	1 1/4	1 5/16	1 3/8	1 13/16	1 3/4	2 1/16	2 1/2	3 1/8
	G	5/16	5/16	7/16	1/2	9/16	11/16	13/16	1	1 1/8	1 1/4	1 3/8	1 5/8
	H	1 1/4	1 1/2	1 7/8	1 7/8	2 1/4	2 5/8	2 15/16	3 5/16				
	J	7/8	1	1 1/8	1 1/8	1 1/4	2	2 1/8	2 1/2				
	K			2 1/8	2 5/16	3	3 1/2	3 15/16	4 3/4				
	L			3	3 5/16	4 1/8	4 13/16	5 3/8	6 5/16				

WEIGHTS (Pounds)

	Dimensions C (Common to all fittings)	.420	.555	.690	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
Class 3000	90° ELBOW	.125	.183	.270	.460	.698	.987	1.480	2.088	3.125	6.340	10.867	25.00
	45° ELBOW	.125	.198	.210	.440	.673	.935	1.365	1.63	2.71	6.75	10.50	18.188
	TEE	.25	.25	.345	.540	.925	1.307	2.00	2.640	4.070	8.75	12.50	27.80
	STREET ELBOW	.25	.25	.375	.50	.875	1.438	2.25	3.00	5.188			
	LATERAL		.25	.625	1.00	1.500	2.375	3.75	4.125	6.285			
	CROSS	.25	.25	.375	.813	1.125	1.550	2.25	3.063	5.125	18.00	23.00	40.00
Class 6000	90° ELBOW				.938	1.440	2.348	3.188	5.25	6.660	11.875	19.25	32.70
	45° ELBOW				.875	1.313	1.913	2.27	4.313	4.813	9.625	14.25	27.25
	TEE				1.375	2.00	3.313	3.75	7.480	8.240	16.625	23.50	33.00
	STREET ELBOW		.375	.438	1.00	1.625	2.50	3.688	6.438				
	LATERAL				2.00	3.063	5.125	6.25	11.938				
	CROSS				1.50	2.50	3.460	5.25	8.75	9.438	20.25	27.00	39.00



Socket Weld Couplings, Reducers & Caps– Class 3000 & 6000

DIMENSIONS (Inches)

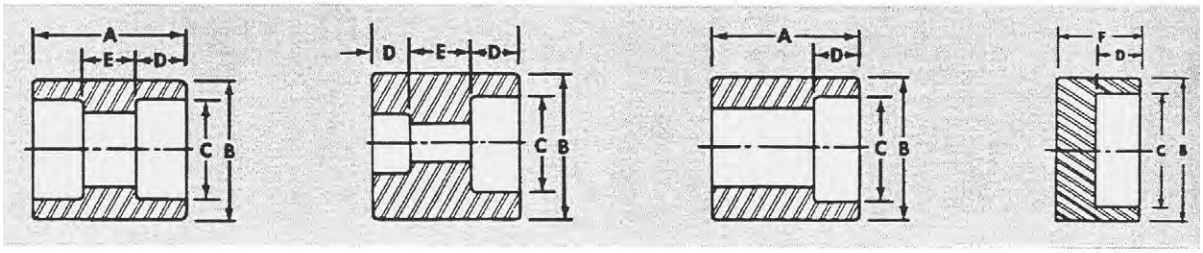
	NOMINAL PIPE SIZE	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Class 3000	A	1 1/8	1 1/8	1 1/8	1 3/8	1 1/2	1 3/4	1 7/8	2	2 1/2	2 1/2	2 3/4	3
	B	3/4	7/8	1 1/16	1 1/4	1 1/2	1 13/16	2 1/4	2 1/2	3	3 5/8	4 5/16	5 1/2
	C	.420	.555	.690	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
	D	7/16	7/16	7/16	1/2	9/16	5/8	1 1/16	3/4	7/8	7/8	1	1 1/8
	E	1/4	1/4	1/4	3/8	3/8	1/2	1/2	1/2	3/4	3/4	3/4	3/4
	F	1 1/16	3/4	3/4	7/8	1	1 1/16	1 3/16	1 1/4	1 1/2	1 9/16	1 13/16	2 1/16

Class 6000	A		1 1/8	1 1/8	1 3/8	1 1/2	1 3/4	1 7/8	2	2 1/2	2 1/2	2 3/4	3
	B		1 1/16	1 5/16	1 1/2	1 3/4	2 1/4	2 1/2	3	3 5/8	4 1/4	5	6 1/4
	C		.555	.690	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
	D		7/16	7/16	1/2	9/16	5/8	1 1/16	3/4	7/8	7/8	1	1 1/8
	E		1/4	1/4	3/8	3/8	1/2	1/2	1/2	3/4	3/4	3/4	3/4
	F		15/16	15/16	1	1 1/16	1 1/4	1 5/16	1 3/8	1 5/8	1 11/16	1 15/16	2 5/16

WEIGHTS (Pounds)

Class 3000	COUPLING	.125	.125	.125	.188	.313	.563	.813	1	2	2.625	3.875	6.625
	REDUCER	.125	.125	.125	.188	.313	.563	.813	1	2	2.625	3.875	6.625
	HALF COUPLING	.125	.125	.125	.188	.313	.563	.813	1	2	2.625	3.875	6.625
	PIPE CAP	.063	.063	.125	.188	.313	.375	.813	1.125	1.688	3	3.625	6.688

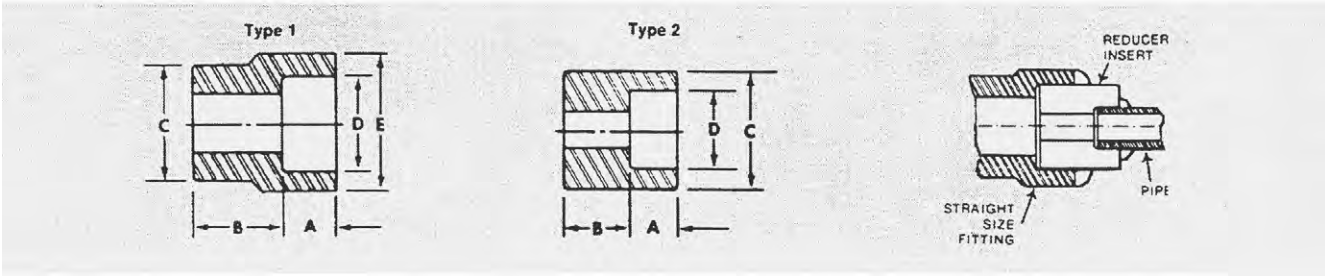
Class 6000	COUPLING				.375	.563	1	1.438	2	3.875	5.50	6.625	13.125
	REDUCER				.375	.563	1	1.438	2	3.875	5.50	6.625	13.125
	HALF COUPLING				.375	.563	1	1.438	2	3.875	5.50	6.625	13.125
	PIPE CAP				.375	.50	1.125	1.125	2.25	3.50	5.625	6	13.50



Socket Weld Reducer Inserts– Class 3000, 6000 & 9000

NOMINAL PIPE SIZE	C	D	Class *3000				Class *6000				Class *9000			
			FTG. TYPE	A	B	E	FTG. TYPE	A	B	E	FTG. TYPE	A	B	E
3/8 x 1/4	.675	.555	1	7/16	3/4	15/16	1	7/16	7/8	1				
1/2 x 3/8	.850	.690	1	7/16	13/16	1 1/16	1	7/16	15/16	1 3/16				
1/2 x 1/4	.850	.555	1	7/16	13/16	15/16	1	7/16	7/8	1				
3/4 x 1/2	1.060	.855	1	7/16	7/8	15/16	1	7/16	1 1/16	1 3/8	1	7/16	13/16	1 3/4
3/4 x 3/8	1.060	.690	2	7/16	5/8	—	1	7/16	7/8	1 3/16				
3/4 x 1/4	1.060	.555	2	3/8	11/16	—	2	3/8	7/8	—				
1 x 3/4	1.325	1.065	1	9/16	15/16	1 1/2	1	9/16	1 1/8	1 11/16	1	9/16	1 1/4	2
1 x 1/2	1.325	.855	2	1/2	5/8	—	1	7/16	1 1/8	1 3/8	1	7/16	1 1/8	1 3/4
1 x 3/8	1.325	.690	2	7/16	11/16	—	2	1/2	7/8	—				
1 x 1/4	1.325	.555	2	3/8	3/4	—	2	3/8	15/16	—				
1 1/4 x 1	1.670	1.330	1	9/16	1	1 7/8	1	9/16	1 3/16	2	1	9/16	1 3/8	2 3/8
1 1/4 x 3/4	1.670	1.065	2	9/16	11/16	—	2	9/16	13/16	—	1	9/16	1 3/16	2
1 1/4 x 1/2	1.670	.855	2	1/2	3/4	—	2	1/2	7/8	—	2	1/2	7/8	—
1 1/4 x 3/8	1.670	.690	2	7/16	13/16	—	2	7/16	15/16	—				
1 1/4 x 1/4	1.670	.555	2	3/8	7/8	—	2	3/8	1	—				
1 1/2 x 1 1/4	1.910	1.675	1	9/16	1 1/8	2 1/4	1	9/16	1 3/8	2 3/8	1	9/16	1 5/8	2 3/4
1 1/2 x 1	1.910	1.330	2	5/8	11/16	—	1	9/16	1 3/16	2	1	9/16	1 3/8	2 3/8
1 1/2 x 3/4	1.910	1.065	2	9/16	3/4	—	2	9/16	1	—	2	9/16	1	—
1 1/2 x 1/2	1.910	.855	2	1/2	13/16	—	2	1/2	1 1/16	—	2	9/16	1	—
1 1/2 x 3/8	1.910	.690	2	7/16	7/8	—	2	7/16	1 1/8	—				
2 x 1 1/2	2.385	1.915	1	9/16	1 1/4	2 1/2	1	9/16	1 7/8	2 11/16	1	9/16	2 1/16	3
2 x 1 1/4	2.385	1.675	2	11/16	13/16	—	2	7/8	15/16	—	1	9/16	2	2 3/4
2 x 1	2.385	1.330	2	5/8	7/8	—	2	13/16	1	—	2	13/16	1	—
2 x 3/4	2.385	1.065	2	9/16	15/16	—	2	3/4	1 1/16	—	2	3/4	1 1/16	—
2 x 1/2	2.385	.855	2	1/2	1	—	2	11/16	1 1/8	—	2	11/16	1 1/8	—

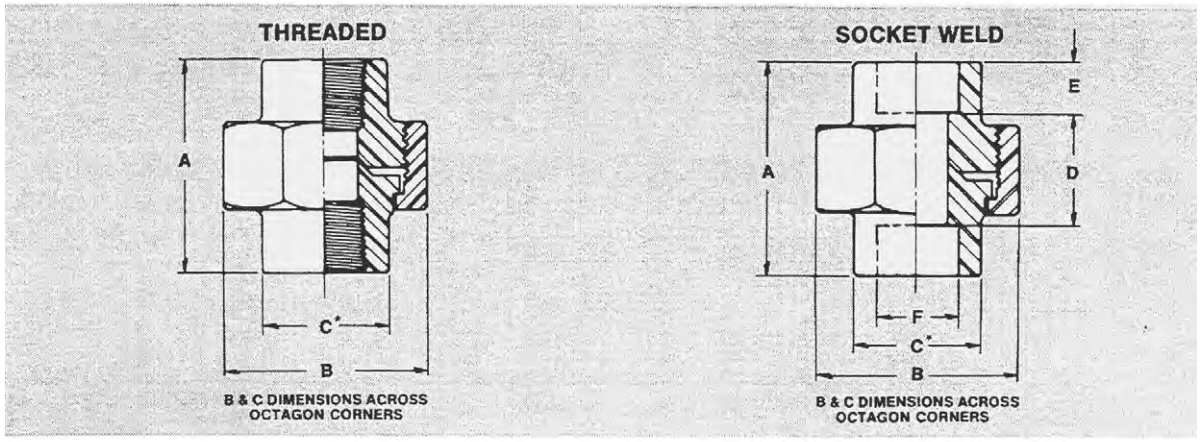
Note: Socket weld reducer inserts comply fully with MSS-SP-79



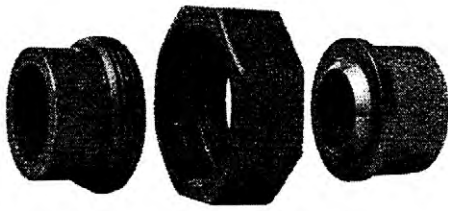
MSS-SP_83 Unions *(formerly AAR Unions)*
Threaded & Socket Weld

CLASS 3000							
PIPE SIZE	A	B	C	D	E	F	WEIGHT PER UNION
1/8	1 11/16	1 31/64	53/64	25/32	7/16	.420 .430	.38 #
1/4	1 11/16	1 31/64	53/64	25/32	7/16	.555 .565	.36 #
3/8	1 27/32	1 11/16	1	31/32	7/16	.690 .700	.50 #
1/2	2	1 15/16	1 3/16	1 3/32	7/16	.855 .865	.695#
3/4	2 1/16	2 3/8	1 15/32	1 5/32	9/16	1.065 1.075	1.175#
1	2 5/16	2 25/32	1 25/32	1 3/8	9/16	1.330 1.340	1.64 #
1 1/4	2 7/8	3 23/64	2 7/32	1 45/64	9/16	1.675 1.685	2.59 #
1 1/2	3	3 23/32	2 35/64	1 7/8	9/16	1.915 1.925	3.41 #
2	3 1/2	4 27/64	3 1/16	2 1/16	1 1/16	2.406 2.416	5.12 #
2 1/2	4 1/4	5 15/64	3 9/16	2 3/8	7/8	2.906 2.921	8.75 #
3	4 7/16	6 5/32	4 9/32	2 7/16	1	3.535 3.550	12.625#

CLASS 6000							
PIPE SIZE	A	B	C	D	E	F	WEIGHT PER UNION
1/8	1 11/16	1 31/64	53/64	25/32	7/16	.420 .430	.5 #
1/4	1 27/32	1 11/16	1	31/32	7/16	.555 .565	.56#
3/8	2	1 15/16	1 3/16	1 3/32	7/16	.690 .700	.75#
1/2	2 5/16	2 3/8	1 15/32	1 5/32	9/16	.855 .865	1.25#
3/4	2 11/16	2 25/32	1 25/32	1 3/8	9/16	1.065 1.075	1.75#
1	2 3/4	3 23/64	2 7/32	1 45/64	9/16	1.330 1.340	3 #
1 1/4	3	3 23/32	2 35/64	1 7/8	9/16	1.675 1.685	3.75#
1 1/2	3 1/2	4 27/64	3 1/16	2 1/16	1 1/16	1.915 1.925	6.0 #
2	4 1/8	5 15/64	3 9/16	2 3/8	7/8	2.406 2.416	10.5 #



*"C" dimension is across octagon corners or a diameter as applicable. The 2½" and 3" 3000 and 2" 6000 sizes have octagonal male and female ends; the other sizes are round.



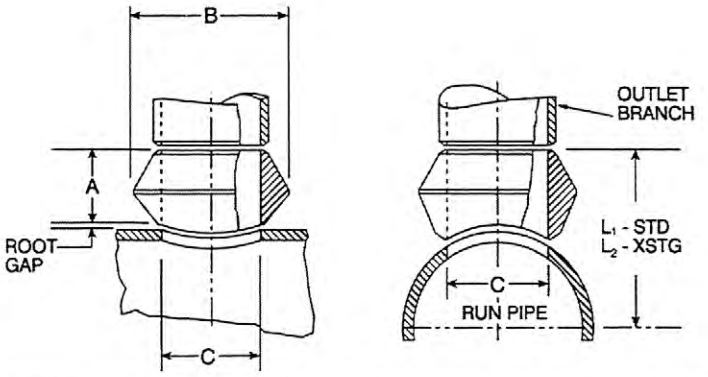
Olets

FLEXOLET™
SA/A105

BUTT WELDED

STANDARD WEIGHT

EXTRA STRONG



	Outlet Size Inches	Dimensions A	B	C	Appx. Weight Pounds
Standard	3/8	3/4	1	0.493	0.10
	1/2	3/4	1-1/8	0.622	0.12
	3/4	7/8	1-1/2	0.824	0.22
	1	1-1/16	1-13/16	1.062	0.32
	1-1/4	1-1/4	2-1/4	1.38	0.64
	1-1/2	1-5/16	2-9/16	1.625	0.78
	2	1-1/2	3-5/16	2.313	1.14
	2-1/2	1-5/8	3-21/32	2.500	1.94
	3	1-3/4	4-9/32	3.125	2.60
	4	2	5-3/8	4.145	4.12
	6	2-3/8	7-21/32	6.112	11.00

	Outlet Size Inches	Dimensions A	B	C	Appx. Weight Pounds
Extra Strong	3/8	3/4	1	0.423	0.10
	1/2	3/4	1-1/8	0.546	0.12
	3/4	7/8	1-1/2	0.742	0.18
	1	1-1/16	1-13/16	1.062	0.36
	1-1/4	1-1/4	2-1/4	1.278	0.55
	1-1/2	1-5/16	2-9/16	1.625	0.68
	2	1-1/2	3-5/16	2.313	1.24
	2-1/2	1-5/8	3-21/32	2.500	2.26
	3	1-3/4	4-9/32	3.125	2.84
	4	2	5-3/8	4.145	4.56
	6	3-1/16	7-23/32	5.800	15.00

Each outlet size listed is available to fit any run curvature.
BW Ends per B16.9 and B16.25. Design per MSS-SP-97.

SCHEDULES — Standard Weight Fittings are the same as schedule 40 fittings through 10". A schedule 40 butt-welded Flexolet for sizes 12" and larger is available. Dimensions and prices on application.
Extra Strong Fittings are the same as schedule 80 fittings through 8". A schedu 80 butt-welded Flexolet for sizes 10" and larger is available. Dimensions and prices on application. Pipe schedule numbers and weight designations are in accordance with ASME B36.10.

FLATS — Flat butt-welded Flexolet fittings for use on welding caps, elliptical heads and f surfaces are available.

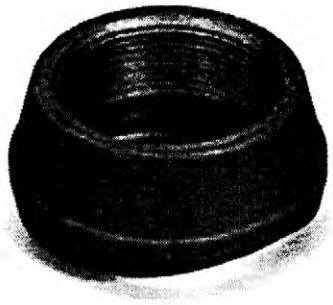
FLEXOLET™

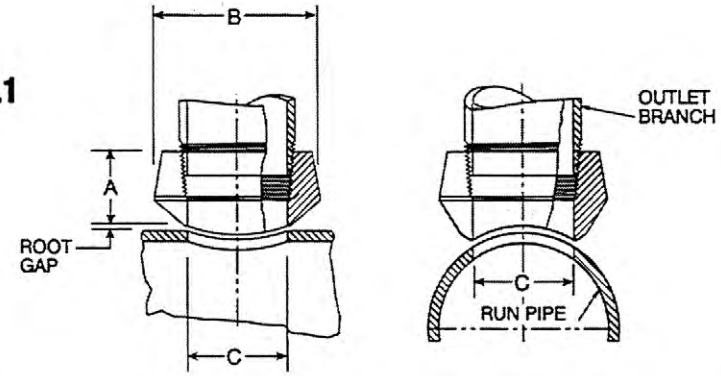
SA/A105 & SA/A350 LF2 CL1

THREADED

CL 3000

CL 6000





	Outlet Size Inches	Dimensions			Appx. Weight Pounds
		A	B	C	
CL 3000	1/4	3/4	1-1/16	.437	0.14
	3/8	13/16	1-1/16	.578	0.14
	1/2	1	1-15/32	.718	0.28
	3/4	1-1/16	1-45/64	.922	0.39
	1	1-5/16	2-3/32	1.156	0.73
	1-1/4	1-5/16	2-17/32	1.500	0.96
	1-1/2	1-3/8	2-25/32	1.734	1.12
	2	1-1/2	3-5/16	2.218	1.66
	2-1/2	1-13/16	3-29/32	2.625	2.73
	3	2	4-21/32	3.250	3.88
	4	2-1/4	5-13/16	4.250	6.18

	Outlet Size Inches	Dimensions			Appx. Weight Pounds
		A	B	C	
CL 6000	1/4	3/4	1-1/16	.437	0.14
	3/8	1-1/8	1-5/16	.578	0.14
	1/2	1-1/4	1-3/4	.718	0.28
	3/4	1-7/16	2-1/16	.922	0.39
	1	1-9/16	2-17/32	1.156	0.73
	1-1/4	1-5/8	2-1/2	1.500	0.96
	1-1/2	1-11/16	3-5/16	1.734	1.12
	2	2-1/16	3-31/32	2.218	1.66

Each outlet size listed is available to fit any run curvature.
Threaded ends are in accordance with ANSI/ASME B1.20.1
Design per MSS-SP-97.

FLATS — A flat Threaded Flexolet for use on welding caps, elliptical heads and flat surfaces is available.

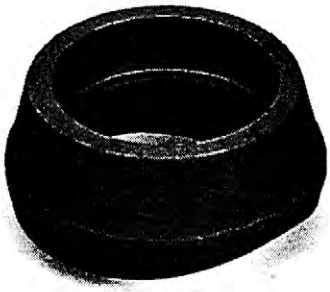
FLEXOLET™

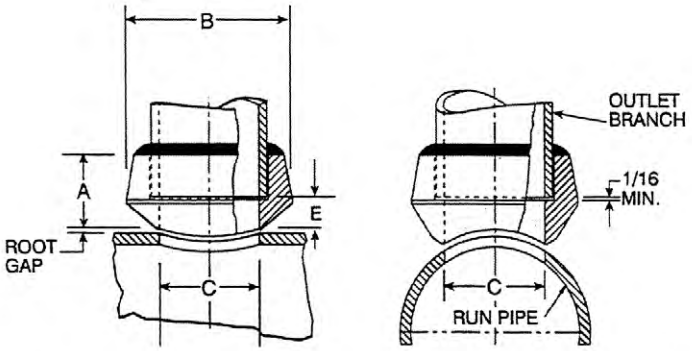
SA/A105 & SA/A350 LF2 CL1

SOCKET WELDED

CL 3000

CL 6000





CL 3000

Outlet Size Inches	Dimensions A	B	C	E	Appx. Weight Pounds
1/4	3/4	1	0.364	3/8	0.14
3/8	13/16	1-1/16	0.493	7/16	0.14
1/2	1	1-15/32	0.622	9/16	0.28
3/4	1-1/16	1-45/64	0.824	9/16	0.39
1	1-5/16	2-3/32	1.049	25/32	0.73
1-1/4	1-5/16	2-17/32	1.38	23/32	0.96
1-1/2	1-3/8	2-25/32	1.61	3/4	1.12
2	1-1/2	3-5/16	2.067	13/16	1.66
2-1/2	1-13/16	3-29/32	2.469	3/4	2.73
3	2	4-21/32	3.068	15/16	3.88
4	2-1/4	5-13/16	4.026	1-1/16	6.60

CL 6000

Outlet Size Inches	Dimensions A	B	C	E	Appx. Weight Pounds
1/2	1-1/4	1-3/4	.464	13/16	0.28
3/4	1-7/16	2-1/16	.612	15/16	0.39
1	1-9/16	2-17/32	.815	1-1/32	0.73
1-1/4	1-5/8	2-1/2	1.16	1-1/32	0.96
1-1/2	1-11/16	3-5/16	1.338	1-1/16	1.63
2	2-1/16	3-31/32	1.687	1-3/8	1.66

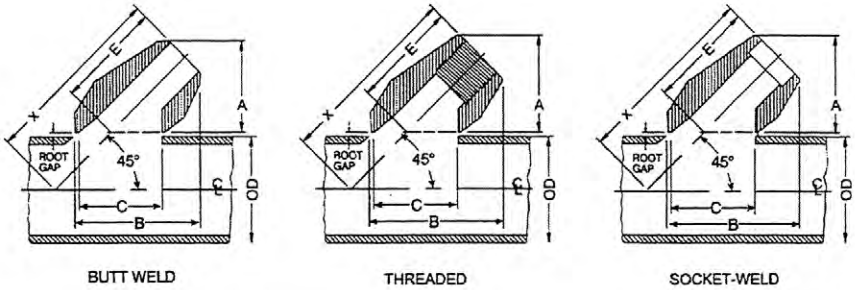
Each outlet size listed is available to fit any run curvature.
Socket dimensions are in accordance with ASME B16.11.
Design per MSS-SP-97.

FLATS — A flat Socket-welded Flexolet for use on welding caps, elliptical heads and flat surfaces is available.

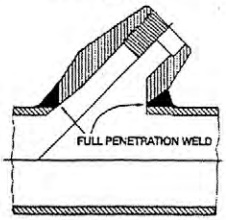
LATROLET®

45° CONNECTIONS

FORGED



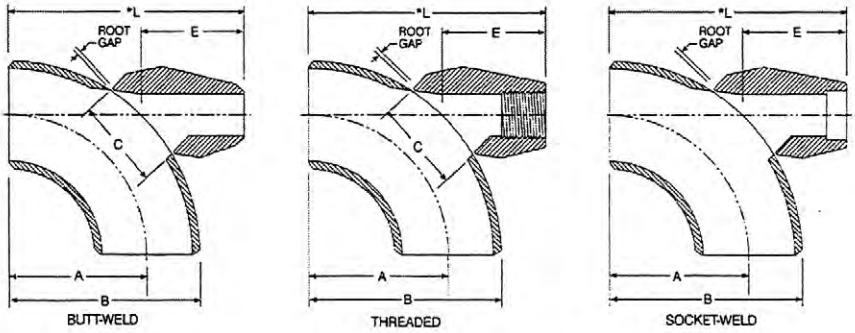
45° BRANCH CONNECTIONS
THREADED, SOCKET-WELD AND BUTT-WELD ENDS



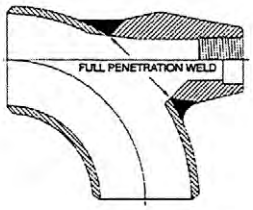
Nominal Run Pipe Size	Outlet Size	Dimensions														
		CL 3000 Threaded and Socket-Weld				CL 6000 Threaded and Socket-Weld				STD & XS Butt-Weld				Sch. 160 and XXS Butt-Weld		
		A	B	C	E	A	B	C	E	A	B	C	E	A	B	C
2-1/2 - 1-1/4 12 - 3	1/4	1-9/16	2-11/32	1-7/16	1-9/16	1-9/16	2-11/32	1-7/16	1-9/16	1-5/16	2-3/32	1-7/16	1-9/16	1-9/16	2-5/16	1-7/16
2-1/2 - 1-1/4 12 - 3	3/8	1-9/16	2-11/32	1-7/16	1-9/16	1-9/16	2-11/32	1-7/16	1-9/16	1-5/16	2-3/32	1-7/16	1-9/16	1-9/16	2-5/16	1-7/16
2-1/2 - 1-1/4 12 - 3	1/2	1-9/16	2-11/32	1-7/16	1-9/16					1-3/8	2-5/32	1-7/16	1-9/16			
1-1/2 - 1-1/4 5 - 2 12 - 6	1/2					1-7/8	2-3/4	1-3/4	1-29/32					1-13/16	2-3/4	1-3/4
1-1/2 - 1-1/4 5 - 2 12 - 6	3/4	1-7/8	2-3/4	1-3/4	1-29/32					1-11/16	2-17/32	1-3/4	1-29/32			
2-1/2 - 2 5 - 3 12 - 6	3/4					2-3/16	3-1/4	2-1/8	2-3/16					2-1/8	3-1/4	2-1/8
2-1/2 - 2 5 - 3 12 - 6	1	2-3/16	3-1/4	2-1/8	2-3/16	2-1/2	3-21/32	2-5/8	2-15/32	1-31/32	3	2-1/8	2-3/16	2-1/2	3-13/16	2-5/8
2-1/2 - 2 5 - 3 12 - 6	1-1/4	2-1/2	3-27/32	2-5/8	2-15/16	2-3/4	4-7/32	3-1/32	2-5/8	2-9/32	3-19/32	2-5/8	2-15/32	2-3/4	4-1/4	3
2-1/2 -2 5 -3 12 -6	1-1/2	2-3/4	4-7/32	3-1/32	2-5/8					2-15/32	3-31/32	3-1/32	2-5/8			
5 - 4 8 - 6 12 - 10	1-1/2					3-3/8	5-7/16	4-1/8	3-5/32					3-3/8	5-3/8	4-1/8
5 - 4 8 - 6 12 - 10	2	3-3/8	5-7/16	4-1/8	3-5/32	3-3/8	5-7/16	4-1/8	3-5/32	3-3/16	5-1/4	4-1/8	3-13/32			
5 - 4 8 - 6 12 - 10	2-1/2									3-5/32	5-3/16	4-1/8	3-5/52			
Order to Specific Run Pipe Sizes	3									3-13/16	6-1/4	4-31/32	3-25/32			
	4									4-3/4	7-13/16	6-7/16	4-9/16			

ELBOLET®

90° LONG RADIUS FORGED



FOR ELBOW OUTLETS
THREADED, SOCKET-WELD AND BUTT-WELD ENDS



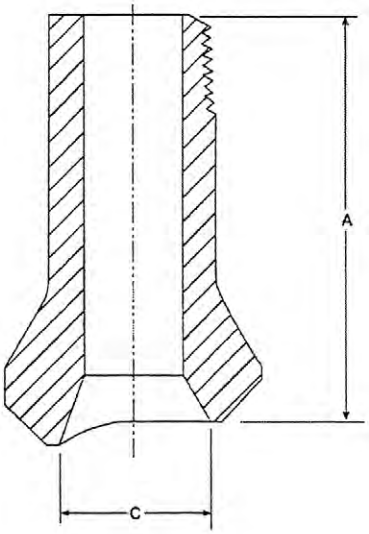
Nominal Elbow Size Inches	Outlet Size Inches	Dimensions			
		CL 3000 Threaded & Socket-Weld Std. & XS Butt-Weld		CL 6000 Threaded & Socket-Weld Sch. 160 & XXS Butt-Weld	
		C	E	C	E
36 - 3/4 36 - 3/4	1/4 3/8	1-1/2 1-1/2	1-19/32 1-19/32	1-1/2 1-1/2	1-19/32 1-19/32
36 - 3/4 36 - 1	1/2 3/4	1-1/2 1-23/32	1-19/32 1-7/8	1-23/32 2-1/4	1-7/8 2-1/4
36 - 2 36 - 2	1 1-1/4	2-1/4 2-7/8	2-1/4 2-1/2	2-7/8 3-1/8	2-1/2 2-11/16
36 - 2 36 - 3	1-1/2 2	3-1/8 4-3/16	2-11/16 3-1/4	4-3/16	3-1/4
Order to Specific Elbow Sizes	**2-1/2 **3 **4 **6 **8 **10 **12	4-3/16 5-1/16 6-5/8 9-3/8 13-5/16 17-1/32 19-5/8	3-1/4 3-7/8 4-13/16 6-1/2 8-1/16 10-3/8 11-1/8	**	**

Footnotes applying to the Elbolet and Latrolet:

Socket Dimensions to ASME B16.11
Thread Dimensions to ANSI/ASME B1.20.1
Butt-welding End Dimensions to ASME B16.9 & B16.25
Each Elbolet 2" & smaller is uniquely designed to fit all the elbow sizes shown. The complete size range interchangeability is so marked on the fitting.
**Available as Butt-Welding outlets only. Larger sizes available - STD/XS/S160/XXS.

NIPOLET®

FORGED



A 1-PIECE FORGED FITTING THAT ELIMINATES THE NIPPLE, A COUPLING AND ONE WELD

It provides 100% reinforcement, improved flow characteristics and better distribution of stresses. The Bonney Forge Nipolet® is a superior, engineered branch connection at far less cost than the coupling and nipple connection.

	Plain End and Threaded						
	Size	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
XS	A	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2
XS	C	15/16	1-3/16	1-7/16	1-3/4	2	2-9/16
XXS	A	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2
XXS	C	9/16	3/4	1	1-5/16	1-1/2	1-11/16

- Threaded or plain end (male socket weld)
- Available in outlet sizes 1/2" thru 2"

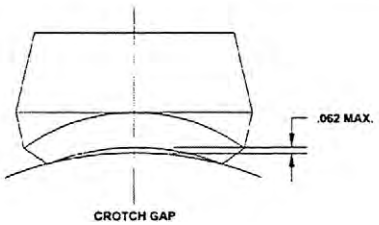
XS and XXS ratings represent the schedule of the nipple portion of the Nipolet® fitting.

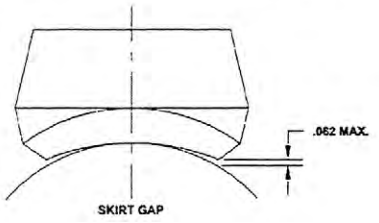
Engineering Specifications

Flexolet™ Run Size Combinations

Flexolet™ SA/A105 & SA/350 LF2 CL1

	Outlet Size Inches											
Butt-Weld, STD	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6
	1/4 36-3/8	1/2-3/8 36-3/4	1-1/2 36-1 1/4	2-3/4 36-2 1/2	1 1 1/2-1 1/4 36-2	1 1/4 2-1 1/2 6-2 1/2 36-8	1 1/2 3 1/2-2 36-4	2 3-2 1/2 6-3 1/2 36-8	2 1/2 4-3 10-5 36-12	3 4-3 1/2 6-5 14-8 36-16	4 6-5 10-8 20-12 36-22	6 8 10 14-12 18-16 24-20 34-26 42-36
Butt-Weld, XS	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6
	36-1/4	3/8 36-1/2	3/4-1/2 36-1	1 1/2-3/4 36-2	1 1 1/2-1 1/4 36-2	2-1 1/4 5-2 1/2 36-6	1 1/2 3 1/2-2 36-4	2 3-2 1/2 6-3 1/2 36-8	2 1/2 4-3 10-5 36-12	3 4-3 1/2 6-5 14-8 36-16	4 6-5 10-8 20-12 36-22	6 8 10 14-12 18-16 24-20 34-26 42-36
Class 3000 Threaded	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
	3/8-1/4 36-1/2	1-3/8 36-1 1/4	1/2 36-3/4	1 1/4-3/4 36-1 1/2	1 2 1/2-1 1/4 36-3	1 1/2-1 1/4 3 1/2-2 36-4	1 1/2 2 1/2-2 5-3 36-6	2 3 1/2-2 1/2 6-4 36-8	2 1/2 3 1/2-3 6-4 36-8	3 5-3 1/2 14-6 36-16	4 6-5 10-8 20-12 36-22	
Class 6000 Threaded	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
	3/8-1/4 36-1/2	1-3/8 36-1 1/4	1/2 36-3/4	3/4 1 1/4-1 36-1 1/2	1 2 1/2-1 1/4 36-3	1 1/2-1 1/4 3 1/2-2 8-4 36-10	1 1/2 2 1/2-2 5-3 36-6	2 3 1/2-2 1/2 6-4 36-8	2 1/2 3 1/2-3 5-4 10-6 26-12 36-28	3 3 1/2 4 6-5 12-8 36-14	4 5 6 10-8 18-12 36-20	
Class 3000 Socket-Weld	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
	1/4 36-3/8	1/2-3/8 36-3/4	1/2 36-3/4	1 1/4-3/4 36-1 1/2	1 2 1/2-1 1/4 36-3	1 1/2-1 1/4 3 1/2-2 36-4	1 1/2 2 1/2-2 5-3 36-6	2 3 1/2-2 1/2 6-4 36-8	2 1/2 3 1/2-3 6-4 36-8	3 5-3 1/2 14-6 36-16	4 6-5 10-8 20-12 36-22	
Class 6000 Socket-Weld	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	
	36-1/4	36-3/8	1/2 36-3/4	1-3/4 36-1 1/4	1 2 1/2-1 1/4 36-3	1 1/4 4-1 1/2 36-5	1 1/2 2 1/2-2 5-3 36-6	2 3 1/2-2 1/2 6-4 36-8	3-2 1/2 5-3 1/2 18-6 36-20	3 1/2-3 5-4 10-6 26-12 36-28	4 5 8-6 14-10 36-16	





Dodson Valco

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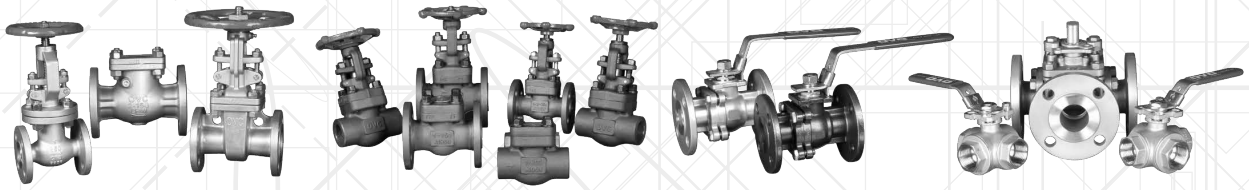
Don't Forget
About our Valves!

OVC
OHIO VALVE COMPANY



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