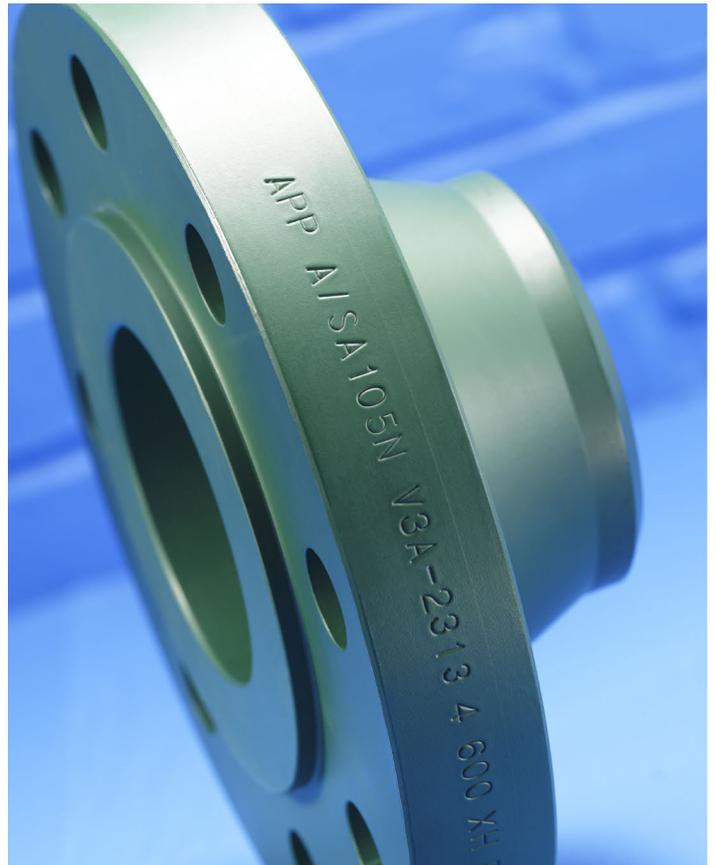
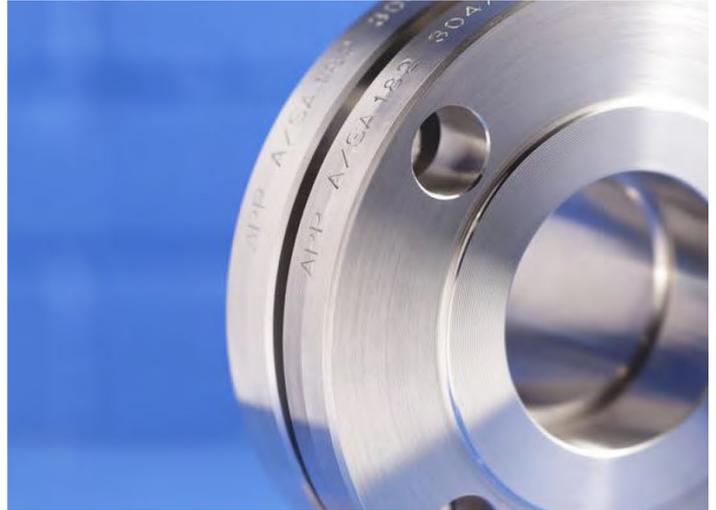


# APP Dimensional Catalog

- » Pipe Dimensions
- » Pipe Weight and Load Chart
- » Fittings & Flanges Dimensions
- » Flanges Dimensions



# Nominal Wall Thickness, Outside & Inside Diameters

Pipe Size	OD	Sch 5		Sch 10s		Sch 10		Sch 20		Sch 30		Sch 40s or STD		Sch 40		Sch 60	
		IPS	O.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.
1/8	.405			.049	.307							.068	.269	.068	.269		
1/4	.540			.065	.410							.088	.364	.088	.364		
3/8	.675			.065	.545							.091	.493	.091	.493		
1/2	.840	.065	.710	.083	.674							.109	.622	.109	.622		
3/4	1.050	.065	.920	.083	.884							.113	.824	.113	.824		
1	1.315	.065	1.185	.109	1.097							.133	1.049	.133	1.049		
1 1/4	1.660	.065	1.530	.109	1.442							.140	1.380	.140	1.380		
1 1/2	1.900	.065	1.770	.109	1.682							.145	1.610	.145	1.610		
2	2.375	.083	2.245	.109	2.157							.154	2.067	.154	2.067		
2 1/2	2.875	.083	2.709	.120	2.635							.203	2.469	.203	2.469		
3	3.500	.083	3.334	.120	3.260							.216	3.068	.216	3.068		
3 1/2	4.000	.083	3.834	.120	3.760							.226	3.548	.226	3.548		
4	4.500	.083	4.334	.120	4.260							.237	4.026	.237	4.026		
5	5.563	.109	5.345	.134	5.295							.258	5.047	.258	5.047		
6	6.625	.109	6.407	.134	6.357							.280	6.065	.280	6.065		
8	8.625	.109	8.407	.148	8.329			.250	8.125	.277	8.071	.322	7.981	.322	7.981	.406	7.813
10	10.750	.134	10.482	.165	10.420			.250	10.250	.307	10.136	.365	10.020	.365	10.020	.500	9.750
12	12.750	.156	12.438	.180	12.390			.250	12.250	.330	12.090	.375	12.000	.406	11.938	.562	11.626
14	14.000	.156	13.688	.188	13.624	.250	13.500	.312	13.376	.375	13.250	.375	13.250	.438	13.124	.594	12.812
16	16.000	.165	15.670	.188	15.624	.250	15.500	.312	15.376	.375	15.250	.375	15.250	.500	15.000	.656	14.688
18	18.000	.165	17.670	.188	17.624	.250	17.500	.312	17.376	.438	17.124	.375	17.250	.562	16.876	.750	16.500
20	20.000	.188	19.624	.218	19.564	.250	19.500	.375	19.250	.500	19.000	.375	19.250	.594	18.812	.812	18.376
22	22.000	.188	21.624	.218	21.564	.250	21.500	.375	21.250	.500	21.000	.375	21.250			.875	20.250
24	24.000	.218	23.564	.250	23.500	.250	23.500	.375	23.250	.562	22.876	.375	23.250	.688	22.624	.969	22.062
26	26.000					.312	25.376	.500	25.000			.375	25.250				
28	28.000					.312	27.376	.500	27.000	.625	26.750	.375	27.250				
30	30.000	.250	29.500	.312	29.376	.312	29.376	.500	29.000	.625	28.750	.375	29.250				
32	32.000					.312	31.376	.500	31.000	.625	30.750	.375	31.250	.688	30.624		
34	34.000					.312	33.376	.500	33.000	.625	32.750	.375	33.250	.688	32.624		
36	36.000					.312	35.376	.500	35.000	.625	34.750	.375	35.250	.750	34.500		
38	38.000											.375	37.250				
40	40.000											.375	39.250				
42	42.000											.375	41.250				
44	44.000											.375	43.250				
46	46.000											.375	45.250				
48	48.000											.375	47.250				

Unless otherwise stated, all dimensions in this brochure are in inches.

# Nominal Wall Thickness, Outside & Inside Diameters

Pipe Size	OD	Sch 80s or XH		Sch 80		Sch 100		Sch 120		Sch 140		Sch 160		XXH	
		IPS	O.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.	Wall	I.D.
1/8	.405	.095	.215	.095	.215										
1/4	.540	.119	.302	.119	.302										
3/8	.675	.126	.423	.126	.423										
1/2	.840	.147	.546	.147	.546							.187	.466	.294	.252
3/4	1.050	.154	.742	.154	.742							.219	.612	.308	.434
1	1.315	.179	.957	.179	.957							.250	.815	.358	.599
1 1/4	1.660	.191	1.278	.191	1.278							.250	1.160	.382	.896
1 1/2	1.900	.200	1.500	.200	1.500							.281	1.338	.400	1.100
2	2.375	.218	1.939	.218	1.939							.344	1.687	.436	1.503
2 1/2	2.875	.276	2.323	.276	2.323							.375	2.125	.552	1.771
3	3.500	.300	2.900	.300	2.900							.438	2.624	.600	2.300
3 1/2	4.000	.318	3.364	.318	3.364									.636	2.728
4	4.500	.337	3.826	.337	3.826			.438	3.624			.531	3.438	.674	3.152
5	5.563	.375	4.813	.375	4.813			.500	4.563			.625	4.313	.750	4.063
6	6.625	.432	5.761	.432	5.761			.562	5.501			.719	5.187	.864	4.897
8	8.625	.500	7.625	.500	7.625	.594	7.437	.719	7.187	.812	7.001	.906	6.813	.875	6.875
10	10.750	.500	9.750	.594	9.562	.719	9.312	.844	9.062	1.000	8.750	1.125	8.500	1.000	8.750
12	12.750	.500	11.750	.688	11.374	.844	11.062	1.000	10.750	1.125	10.500	1.312	10.126	1.000	10.750
14	14.000	.500	13.000	.750	12.500	.938	12.124	1.094	11.812	1.250	11.500	1.406	11.188		
16	16.000	.500	15.000	.844	14.312	1.031	13.938	1.219	13.562	1.438	13.124	1.594	12.812		
18	18.000	.500	17.000	.938	16.124	1.156	15.688	1.375	15.250	1.562	14.876	1.781	14.438		
20	20.000	.500	19.000	1.031	17.938	1.281	17.438	1.500	17.000	1.750	16.500	1.969	16.062		
22	22.000	.500	21.000	1.125	19.750	1.375	19.250	1.625	18.750	1.875	18.250	2.125	17.750		
24	24.000	.500	23.000	1.219	21.562	1.531	20.938	1.812	20.376	2.062	19.876	2.344	19.312		
26	26.000	.500	25.000												
28	28.000	.500	27.000												
30	30.000	.500	29.000												
32	32.000	.500	31.000												
34	34.000	.500	33.000												
36	36.000	.500	35.000												
38	38.000	.500	37.000												
40	40.000	.500	39.000												
42	42.000	.500	41.000												
44	44.000	.500	43.000												
46	46.000	.500	45.000												
48	48.000	.500	47.000												

Unless otherwise stated, all dimensions in this brochure are in inches.

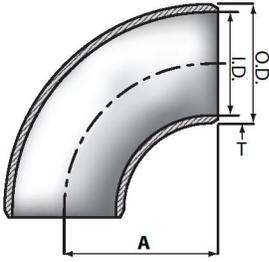
# Pipe Weight & Load Chart

Nominal Size	Wall	Schedule	Pipe Weight per Foot	Footage per Truckload		Joints per Truckload		
				Bare/FBE		# of Joints	Pyramid	Strip
				Pyramid	Strip	Bedded	Loaded	Loaded
2	0.154	40/STD	3.66	12,306	12,306	39	293	293
2	0.218	80/XH	5.03	8,946	8,946	39	213	213
3	0.216	40/STD	7.58	5,922	5,922	26	141	141
3	0.300	80/XH	10.26	4,368	4,368	26	104	104
4	0.188		8.67	5,208	5,208	20	124	124
4	0.237	40/STD	10.80	4,158	4,158	20	99	99
4	0.337	80/XH	15.00	2,982	2,982	20	71	71
6	0.188		12.94	3,486	3,486	13	83	83
6	0.219		15.00	2,982	2,982	13	71	71
6	0.250		17.04	2,646	2,646	13	63	63
6	0.280	40/STD	18.99	2,352	2,352	13	56	56
6	0.432	80/XH	28.60	1,554	1,554	13	37	37
8	0.188		16.96	2,268	2,646	10	54	63
8	0.219		19.68	2,268	2,268	10	54	54
8	0.250	20	22.38	2,016	2,016	10	48	48
8	0.322	40/STD	28.58	1,554	1,554	10	37	37
8	0.500	80/XH	43.43	1,050	1,050	10	25	25
10	0.250	20	28.06	1,470	1,596	8	35	38
10	0.365	40/STD	40.52	1,092	1,092	8	26	26
10	0.500	60/XH	54.79	840	840	8	20	20
12	0.250	20	33.41	1,134	1,344	7	27	32
12	0.312		41.48	1,092	1,092	7	26	26
12	0.375	STD	49.61	924	924	7	22	22
12	0.500	XH	65.48	672	672	7	16	16
16	0.312	20	52.32	840	840	6	20	20
16	0.375	30/STD	62.64	714	714	6	17	17
16	0.500	40/XH	82.85	546	546	6	13	13
20	0.375	20/STD	78.67	588	588	5	14	14
20	0.500	30/XH	104.23	420	420	5	10	10
24	0.375	20/STD	94.71	378	462	4	9	11
24	0.500	XH	125.61	378	378	4	9	9

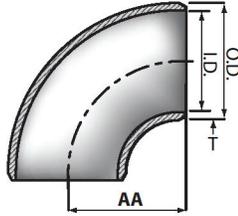
**Above calculations are based on the following:**

1. Loading 45,000 lbs maximum per truck.
2. Trailer width of 96" (Some trailers are 102").
3. The maximum load height is 13'6".
4. Pipe & coating weight are theoretical. Please verify for each individual requirement.

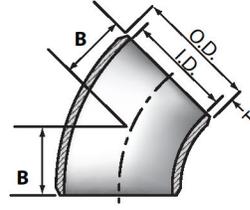
## Long Radius/Short Radius Elbows



90° elbow long radius



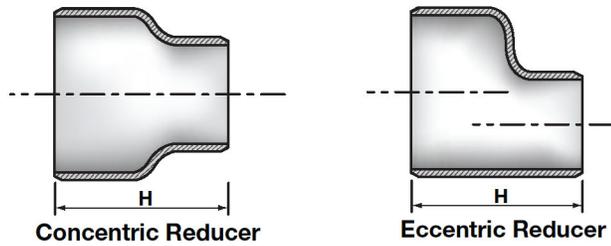
90° elbow short radius



45° elbow long radius

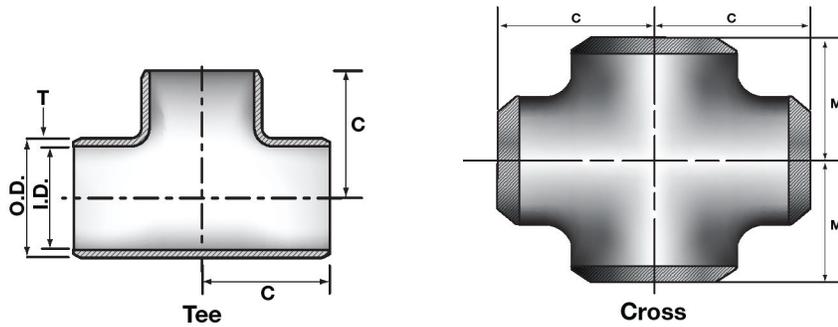
Pipe Size	Outside Diameter	90° Elbow		45° Elbow
		Long Radius	Short Radius	Long Radius
IPS	O.D.	A	AA	B
1/2	.840	1 1/2		5/8
3/4	1.050	1 1/2		3/4
1	1.315	1 1/2	1	7/8
1 1/4	1.660	1 7/8	1 1/4	1
1 1/2	1.900	2 1/4	1 1/2	1 1/8
2	2.375	3	2	1 3/8
2 1/2	2.875	3 3/4	2 1/2	1 3/4
3	3.500	4 1/2	3	2
3 1/2	4.000	5 1/4	3 1/2	2 1/4
4	4.500	6	4	2 1/2
5	5.563	7 1/2	5	3 1/8
6	6.625	9	6	3 3/4
8	8.625	12	8	5
10	10.750	15	10	6 1/4
12	12.750	18	12	7 1/2
14	14.000	21	14	8 3/4
16	16.000	24	16	10
18	18.000	27	18	11 1/4
20	20.000	30	20	12 1/2
24	24.000	36	24	15
30	30.000	45	30	18 1/2
36	36.000	54	36	22 1/4

### Concentric and Eccentric Reducers



Pipe Size		H	Pipe Size		H	Pipe Size		H
3/4	x 1/2	1 1/2	4	x 1 1/2	4	14	x 8	13
1	x 1/2	2		x 2	4		x 10	13
	x 3/4	2		x 2 1/2	4		x 12	13
1 1/4	x 1/2	2	5	x 3	4	16	x 5	14
	x 3/4	2		x 3 1/2	4		x 6	14
	x 1	2		x 2	5		x 8	14
1 1/2	x 1/2	2 1/2	6	x 2 1/2	5	18	x 10	14
	x 3/4	2 1/2		x 3	5		x 10	15
	x 1	2 1/2		x 3 1/2	5		x 12	15
	x 1 1/4	2 1/2		x 4	5		x 14	15
2	x 3/4	3	8	x 2 1/2	5 1/2	20	x 16	15
	x 1	3		x 3	5 1/2		x 10	20
	x 1 1/4	3		x 3 1/2	5 1/2		x 12	20
	x 1 1/2	3		x 4	5 1/2		x 14	20
2 1/2	x 1	3 1/2	10	x 5	5 1/2	24	x 16	20
	x 1 1/4	3 1/2		x 3 1/2	6		x 18	20
	x 1 1/2	3 1/2		x 4	6		x 12	20
	x 2	3 1/2		x 5	6		x 14	20
3	x 1 1/4	3 1/2	12	x 6	6	30	x 16	20
	x 1 1/2	3 1/2		x 4	7		x 18	20
	x 2	3 1/2		x 5	7		x 20	20
	x 2 1/2	3 1/2		x 6	7		x 18	24
3 1/2	x 1 1/4	4	12	x 8	7	36	x 20	24
	x 1 1/2	4		x 5	8		x 24	24
	x 2	4		x 6	8		x 24	24
	x 2 1/2	4		x 8	8		x 30	24
	x 3	4		x 10	8			

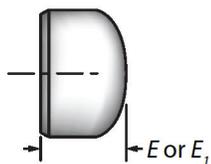
## Tees and Crosses



Pipe Size	Outside Diameter	C/M
1/2	.840	1
3/4	1.050	1 1/8
1	1.315	1 1/2
1 1/4	1.660	1 7/8
1 1/2	1.900	2 1/4
2	2.375	2 1/2
2 1/2	2.875	3
3	3.500	3 3/8
3 1/2	4.000	3 3/4
4	4.500	4 1/8
5	5.563	4 7/8
6	6.625	5 5/8
8	8.625	7
10	10.750	8 1/2
12	12.750	10
14	14.000	11
16	16.000	12
18	18.000	13 1/2
20	20.000	15
24	24.000	17



### Caps



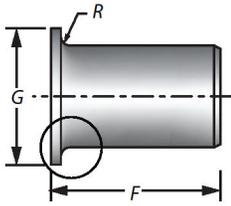
Pipe Size	Outside Diameter	Cap	Cap
		E	E1
1/2	.840	1	
3/4	1.050	1	
1	1.315	1 1/2	
1 1/4	1.660	1 1/2	
1 1/2	1.900	1 1/2	
2	2.375	1 1/2	1 3/4
2 1/2	2.875	1 1/2	2
3	3.500	2	2 1/2
3 1/2	4.000	2 1/2	3
4	4.500	2 1/2	3
5	5.563	3	3 1/2
6	6.625	3 1/2	4
8	8.625	4	5
10	10.750	5	6
12	12.750	6	7
14	14.000	6 1/2	7 1/2
16	16.000	7	8
18	18.000	8	9
20	20.000	9	10
24	24.000	10 1/2	12

Per ANSI B16.9 NOTES:

(1) Length E applies for thickness not exceeding that given in column "Limiting Wall Thickness for Length, E."

(2) Length E1 applies for thickness greater than that given in column "Limiting Wall Thickness" for NPS 24 and smaller.

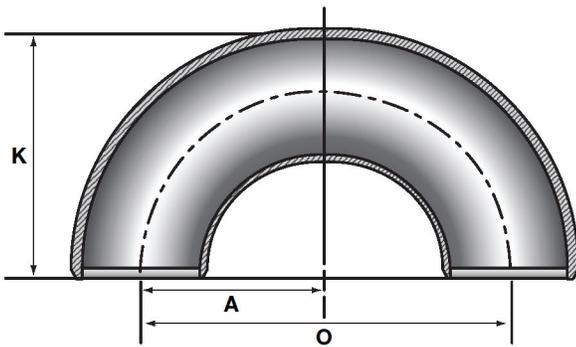
### Stub Ends



Pipe Size	Outside Diameter	Length		G	Radius	
		F (short)	F (long)		Type A	Type B
1/2	.840	2	3	1 3/8	1/8	1/32
3/4	1.050	2	3	1 11/16	1/8	1/32
1	1.315	2	4	2	1/8	1/32
1 1/4	1.660	2	4	2 1/2	3/16	1/32
1 1/2	1.900	2	4	2 7/8	1/4	1/32
2	2.375	2 1/2	6	3 5/8	5/16	1/32
2 1/2	2.875	2 1/2	6	4 1/8	5/16	1/32
3	3.500	2 1/2	6	5	3/8	1/32
3 1/2	4.000	3	6	5 1/2	3/8	1/32
4	4.500	3	6	6 3/16	7/16	1/32
5	5.563	3	8	7 5/16	7/16	1/16
6	6.625	3 1/2	8	8 1/2	1/2	1/16
8	8.625	4	8	10 5/8	1/2	1/16
10	10.750	5	10	12 3/4	1/2	1/16
12	12.750	6	10	15	1/2	1/16
14	14.000	6	12	16 1/4	1/2	1/16
16	16.000	6	12	18 1/2	1/2	1/16
18	18.000	6	12	21	1/2	1/16
20	20.000	6	12	23	1/2	1/16
24	24.000	6	12	27 1/4	1/2	1/16
26	26.000	6	12	29 1/2	1/2*	1/16*
28	28.000	6	12	31 1/2	1/2*	1/16*
30	30.000	6	12	33 3/4	1/2*	1/16*
32	32.000	6	12	35 3/4	1/2*	1/16*
34	34.000	6	12	37 3/4	1/2*	1/16*
36	36.000	6	12	40 1/4	1/2*	1/16*
38	38.000	6	12	42 1/4	1/2*	1/16*
40	40.000	6	12	44 1/4	1/2*	1/16*
42	42.000	6	12	46 1/2	1/2*	1/16*
44	44.000	6	12	48 7/8	1/2*	1/16*
46	46.000	6	12	50 7/8	1/2*	1/16*
48	48.000	6	12	52 7/8	1/2*	1/16*

\*not covered by MSS or B16.9.

## LR Return Bends



Pipe Size	Outside Diameter	Center to Center	Back To Face
IPS	O.D.	O	K
1/2	.840	3.00	1.88
3/4	1.050	3.00	2.00
1	1.315	3.00	2.19
1 1/4	1.660	3.75	2.75
1 1/2	1.900	4.50	3.25
2	2.375	6.00	4.19
2 1/2	2.875	7.50	5.19
3	3.500	9.00	6.25
3 1/2	4.000	10.50	7.25
4	4.500	12.00	8.25
5	5.563	15.00	10.31
6	6.625	18.00	12.31
8	8.625	24.00	16.31

Dimension A is equal to one-half of dimension O.

Schedule 10s Weights

Nominal Pipe Size	90° Elbow		45° Elbow	Tee	Lap Joint Stub Ends		Cap	180° Return Bends	Crosses
	Long Radius	Short Radius	Long Radius		MSS Length	ASA Length			
1/2	.13	--	.06	.20	.17	.20	.03	.26	
3/4	.16	--	.08	.28	.21	.25	.03	.41	
1	.38	--	.25	.60	.33	.52	.10	.75	.72
1 1/4	.50	--	.33	1.10	.45	.70	.13	1.26	1.26
1 1/2	.75	--	.47	1.50	.57	.87	.23	1.75	1.72
2	1.10	--	.60	1.80	.91	1.66	.30	3.13	2.15
2 1/2	1.80	--	1.00	3.00	1.05	2.03	.40	5.88	3.56
3	2.50	--	1.30	3.90	1.61	3.04	.72	9.81	4.48
3 1/2	3.40	--	1.70	4.90	2.07	3.48	.83	10.5	6.76
4	4.30	--	2.20	5.70	2.52	4.17	1.16	13.6	8.77
5	7.40	5.19	3.80	12.0	3.44	7.13	1.61	16.0	15.46
6	11.0	7.45	5.50	17.0	4.79	8.85	1.93	24.0	20.47
8	21.0	31.0	11.0	25.0	7.62	12.9	2.78	47.0	39.67
10	36.0	24.9	18.0	47.0	12.1	21.0	4.66	--	67.85
12	57.0	38.1	29.0	119.0	17.9	26.9	7.05	--	--
14	78.0	51.7	39.4	59.6	22.3	37.8	9.20	--	--
16	102.	67.7	51.0	75.9	27.5	43.9	11.5	--	--
18	129.	85.7	64.5	94.7	35.2	46.9	14.5	--	--
20	185.	122.	92.5	130.	49.8	67.1	20.5	--	--
24	306.	203.	153.	200.	77.4	118	32.9	--	--
30	596.	388.	298.	--	--	--	--	--	--

Nominal Pipe Size		Reducing Tee	Reducers	Nominal Pipe Size		Reducing Tee	Reducers	Nominal Pipe Size		Reducing Tee	Reducers	
3/4	x 1/2	.28	.16	4	x 1 1/2	5.38	2.09	12	x 5	49.8	18.7	
	x 1/2	.56	.37		x 2	5.43	2.16		x 6	51.7	19.2	
	x 3/4	.60	.38		x 2 1/2	5.45	2.22		x 8	53.0	20.4	
1 1/4	x 1/2	1.06	.39		5	x 3	5.60	2.28	14	x 10	54.0	20.9
	x 3/4	1.10	.42			x 3 1/2	5.70	2.41		x 8	52.5	29.8
	x 1	1.15	.44			x 2	10.8	3.35		x 10	53.5	30.5
1 1/2	x 1/2	1.33	.49	6	x 2 1/2	11.1	3.64	16	x 12	54.3	31.2	
	x 3/4	1.41	.53		x 3	11.4	3.90		x 8	67.1	33.6	
	x 1	1.45	.56		x 3 1/2	11.7	4.30		x 10	39.3	34.1	
	x 1 1/4	1.50	.59		x 4	12.0	4.29		x 12	71.2	34.6	
2	x 3/4	1.37	.71	8	x 2 1/2	15.7	4.79	18	x 14	72.4	35.7	
	x 1	1.67	.78		x 3	16.0	5.04		x 10	83.5	45.6	
	x 1 1/4	1.72	.82		x 3 1/2	16.2	5.28		x 12	86.5	46.6	
	x 1 1/2	1.80	.85		x 4	16.5	5.52		x 14	88.7	47.5	
2 1/2	x 1	2.49	1.04	10	x 5	17.0	5.76	20	x 16	90.2	48.5	
	x 1 1/4	1.62	1.09		x 3 1/2	23.4	6.88		x 10	126	83.2	
	x 1 1/2	2.74	1.12		x 4	23.9	7.10		x 12	126	84.6	
3	x 2	3.00	1.18	12	x 5	24.5	7.51	24	x 14	126	85.5	
	x 1 1/4	3.61	1.33		x 6	25.0	7.80		x 16	127	86.3	
	x 1 1/2	3.65	1.39		x 4	30.1	10.5		x 18	128	87.6	
	x 2	3.75	1.45		x 5	32.3	12.6		x 12	191	107	
3 1/2	x 2 1/2	3.90	1.53	12	x 6	36.3	13.3	24	x 14	192	121	
	x 1 1/2	4.20	1.73		x 8	37.0	14.0		x 16	193	125	
	x 2	4.49	1.83		x 5	49.8	18.7		x 18	194	128	
	x 2 1/2	4.73	1.96		x 6	51.7	19.2		x 20	195	132	
	x 3	4.90	2.12		x 8	53.0	20.4					
					x 10	54.0	20.9					



Schedule 80s Weights

Nominal Pipe Size	90° Elbow		45° Elbow	Tee	Lap Joint Stub Ends		Cap	180° Return Bends	Crosses
	Long Radius	Short Radius	Long Radius		ASA Length	MSS Length			
1/2	.25	--	.19	.45	.46	.38	.15	.43	
3/4	.25	--	.19	.60	.51	.51	.20	.69	
1	.50	0.41	.31	.88	1.38	.87	.30	1.38	.86
1 1/4	.90	0.63	.50	1.60	1.92	1.24	.40	2.50	1.51
1 1/2	1.15	0.75	.69	2.25	2.30	1.51	.50	3.00	2.27
2	2.20	1.5	1.19	4.00	5.64	3.10	.75	6.21	3.53
2 1/2	4.00	2.8	2.13	7.00	8.95	4.64	1.00	9.71	6.97
3	6.50	4.25	3.50	8.50	12.0	6.36	1.75	17.19	9.9
3 1/2	8.35	6.00	4.50	12.0	13.0	7.71	2.50	22.00	12.12
4	13.5	8.50	6.10	15.7	15.5	9.37	3.00	34.30	17.17
5	22.0	14.0	10.7	26.0	34.7	16.7	5.50	43.00	25.25
6	35.0	23.0	17.5	40.0	42.5	23.0	9.00	72.00	30.3
8	71.0	47.5	35.0	75.0	59.3	34.9	16.0	146.00	62.62
10	107	70.0	53.0	105	93.0	53.6	25.0	--	111
12	160	104	84.0	160	97.4	64.7	36.0	--	--
14	205	140	100	240	57.7	34.0	45.0	--	--
16	276	174	135	280	155	97.4	54.0	--	--
18	340	219	167	332	149	112	72.0	--	--
20	420	275	206	480	170	126	86.0	--	--
24	600	392	300	610	232	152	130	--	--
30	975	618	488	--	--	--	--	--	--
36	1412	904	706	--	--	--	--	--	--

Nominal Pipe Size	Reducing Tee	Reducers	Nominal Pipe Size	Reducing Tee	Reducers	Nominal Pipe Size	Reducing Tee	Reducers	
3/4	x 1/2	.50	4	x 1 1/2	15.2	14	x 8	78.5	
1	x 1/2	1.00		x 2	15.5		4.25	x 10	223.
	x 3/4	1.00		x 2 1/2	15.5		4.38	x 12	237.
1 1/4	x 1/2	1.75	5	x 3	15.6	16	x 8	260.	
	x 3/4	1.75		x 3 1/2	15.6		4.75	x 10	266.
	x 1	1.75		x 2	23.5		6.50	x 12	270.
1 1/2	x 1/2	2.50	6	x 2 1/2	24.0	18	x 14	275.	
	x 3/4	2.50		x 3	24.5		7.50	x 10	296
	x 1	2.50		x 3 1/2	25.0		7.75	x 12	307
	x 1 1/4	2.50		x 4	25.5		8.25	x 14	315
2	x 3/4	4.00	8	x 2 1/2	36.0	20	x 16	321	
	x 1	4.10		x 3	37.0		10.5	x 10	466
	x 1 1/4	4.13		x 3 1/2	38.2		11.0	x 12	469
	x 1 1/2	4.25		x 4	39.2		11.5	x 14	472
2 1/2	x 1	7.00	10	x 5	40.0	24	x 16	475	
	x 1 1/4	7.06		x 3 1/2	70.5		16.5	x 18	477
	x 1 1/2	7.13		x 4	71.7		17.0	x 12	592
	x 2	7.19		x 5	73.0		18.0	x 14	595
3	x 1 1/4	7.60	12	x 6	74.0	24	x 16	589	
	x 1 1/2	7.68		x 4	104		25.5	x 18	601
	x 2	8.00		x 5	106		28.0	x 20	604
	x 2 1/2	8.25		x 6	108		29.5		
3 1/2	x 1 1/2	11.5	12	x 8	109	24			
	x 2	11.8		x 5	160		39.0		
	x 2 1/2	12.2		x 6	165		40.0		
	x 3	12.6		x 8	175		42.0		
				x 10	184	43.5			

Schedule 160 Weights

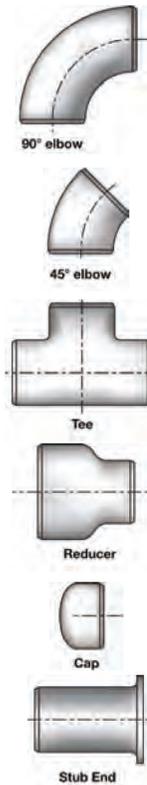
	Nominal Pipe Size	90° Elbow		45° Elbow	Tee	Lap Joint Stub Ends		Cap	180° Return Bends
		Long Radius	Short Radius	Long Radius		ASA Length	MSS Length		
<b>160</b>	1/2	.46		.24	.60	.83	.68	.22	
	3/4	.5		.24	.90	.94	.94	.28	
	1	.96	.76	.62	1.70	2.80	1.76	.58	1.19
	1 1/4	1.76	1.26	1	3.00	3.90	2.52	.78	1.96
	1 1/2	2.26	1.76	1.26	4.50	4.54	2.98	1.08	3.17
	2	4	3.1	2.26	7.00	11.10	6.10	1.50	3.91
	2 1/2	8	5.76	4.38	13.80	17.0	8.80	2.24	9.4
	3	13.12	8.4	6.62	19.60	18.50	9.80	3.74	11.33
	3 1/2	17.6	10.7	8.8	24.00	26.13	15.50	5.00	--
	4	27.26	18.12	13.64	34.00	31.9	19.30	7.08	26.95
	5	42.26	32.2	21.12	50.00	67.9	32.66	11.26	41.91
	6	72	52	36	60.00	86.64	45.26	20.00	50.29
	8	127	109	63.87	108.00	101.46	59.71	22.76	113
	10	257	224	128	--	--	--	62	249
	12	459	328	230	--	--	--	96	--
	14	--	--	--	--	--	--	--	--
	16	--	--	--	--	--	--	--	--
18	--	--	--	--	--	--	--	--	
20	--	--	--	--	--	--	--	--	
24	--	--	--	--	--	--	--	--	

Nominal Pipe Size	Reducing Tee	Reducers	Nominal Pipe Size	Reducing Tee	Reducers	Reducing Tee	Reducers	Reducing Tee	Reducers	
3/4	x 1/2	.57	4	x 1 1/2	22.56	14	x 8	--	--	
1	x 1/2	1.04		x 2	22.83		6.56	x 10	--	--
	x 3/4	1.07		x 2 1/2	23.10		6.76	x 12	--	--
1 1/4	x 1/2	1.69	5	x 3	23.63	16	x 8	--	--	
	x 3/4	1.73		x 2	35.07		8.07	x 10	--	--
1 1/2	x 1	1.77	6	x 2 1/2	35.48	18	x 12	--	--	
	x 1/2	2.67		x 3	35.90		13.16	x 14	--	--
	x 3/4	2.71		x 4	37.57		14.19	x 10	--	--
2	x 1	2.77	8	x 2 1/2	41.83	20	x 12	--	--	
	x 1 1/4	2.83		x 3	42.33		15.12	x 14	--	--
	x 3/4	4.67		x 4	43.82		18.06	x 16	--	--
2 1/2	x 1	4.73	10	x 5	44.82	24	x 10	--	--	
	x 1 1/4	4.84		x 4	96.30		21.81	x 12	--	--
	x 1 1/2	4.95		x 5	98.50		22.89	x 14	--	--
3	x 1	7.97	10	x 6	101.00	24	x 16	--	--	
	x 1 1/4	8.06		x 4	210.00		36.85	x 18	--	--
	x 1 1/2	8.25		x 5	212.00		38.50	x 12	--	--
3	x 2	8.44	10	x 6	217.00	24	x 14	--	--	
	x 1 1/4	12.16		x 8	222.00		40.30	x 16	--	--
	x 1 1/2	12.30		x 5	411.00		62.30	x 18	--	--
	x 2	12.59		x 6	416.00		70.60	x 14	--	--
	x 2 1/2	12.88		x 8	426.00	73.30	x 16	--	--	
				x 10	435.00	77.10	x 18	--	--	
							x 20	--	--	

Dimension Tolerances

Nominal Pipe Size	All Fittings				90° and 45° Elbows Tees	Caps
	Outside Diameter at Bevel		Inside Diameter at End	Wall Thickness	Center-to-End	Overall Length
	Schedules 5S and 10S Tube O.D.	Schedules Heavier than Sch. 10S				
1/2-1 1/2	+ 1/64	+ 1/16	± 1/32	Not less than 87 1/2% of nominal thickness	± 1/16	± 1/8
	- 1/32	- 1/32				
2-2 1/2	± 1/32	+ 1/16	± 1/32		± 1/16	± 1/8
		- 1/32				
3-3 1/2	± 1/32	± 1/16	± 1/16		± 1/16	± 1/8
4	± 1/32	± 1/16	± 1/16		± 1/16	± 1/8
5-8	- 1/16	+ 3/32	± 1/16		± 1/16	± 1/4
	- 1/32	- 1/16				
10-12	+ 3/32	+ 5/32	± 1/8		± 3/32	± 1/4
	- 1/32	- 1/8				
14-18	+ 3/32	+ 5/32	± 1/8	± 3/32	± 1/4	
	- 1/32	- 1/8				
20-24	+ 1/8	+ 1/4	± 3/16	± 3/32	± 1/4	
	- 1/32	- 3/16				



Nominal Pipe Size	180° Returns			Reducers Lap Joint Stub Ends	Lap Joint Stub Ends			
	Center-to-Center	Back-to-Face	Alignment of Ends	Overall Length	Outside Diameter of Lap	Thickness of Lap	Fillet Radius of Lap	Outside Diameter of Barrel
1/2-1 1/2	± 1/4	± 1/4	± 1/32	± 1/16	+ 0	+ 1/16	+ 0	Tolerances assure slip fit into Lap Joint Flange of minimum permissible inside diameter
					- 1/32	- 0	- 1/32	
2-2 1/2	± 1/4	± 1/4	± 1/32	± 1/16	+ 0	+ 1/16	+ 0	
					- 1/32	- 0	- 1/32	
3-3 1/2	± 1/4	± 1/4	± 1/32	± 1/16	+ 0	+ 1/16	+ 0	
					- 1/32	- 0	- 1/32	
4	± 1/4	± 1/4	± 1/32	± 1/16	+ 0	+ 1/16	+ 0	
					- 1/32	- 0	- 1/16	
5-8	± 1/4	± 1/4	± 1/32	± 1/16	+ 0	+ 1/16	+ 0	
					- 1/32	- 0	- 1/16	
10-12	± 3/8	± 1/4	± 1/16	± 3/32	+ 0	+ 1/16	+ 0	
					- 1/16	- 0	- 1/16	
14-18	± 3/8	± 1/4	± 1/16	± 3/32	+ 0	+ 1/16	+ 0	
					- 1/16	- 0	- 1/16	
20-24	± 3/8	± 1/4	± 1/16	± 3/32	+ 0	+ 1/16	+ 0	
					- 1/16	- 0	- 1/16	

# Flanges Dimensions



NPS	150 LB. FLANGES							300 LB. FLANGES							400 LB. FLANGES							Norm. Pipe Size
	O	C	Weld Neck	Y Slip On Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C	Weld Neck	Y Slip On Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C	Weld Neck	Slip On Thrd.	Y Slip On Thrd.	Bolt Circle	No. and Size of Holes	
1/2	3 1/2	7/8	1 1/8	3/4	5/8	2 1/4	4 - 5/8	3 3/4	7/8	2 1/8	3/4	7/8	2 1/8	4 - 5/8	3 3/4	7/8	2 1/8	3/4	7/8	2 1/8	4 - 5/8	1/2
3/4	3 7/8	1 1/8	2 1/8	5/8	5/8	2 3/4	4 - 5/8	4 5/8	7/8	2 1/4	1	1	3 1/4	4 - 3/4	4 5/8	7/8	2 1/8	1	1	3 1/2	4 - 3/4	3/4
1	4 1/4	1 1/8	2 1/2	5/8	5/8	3 1/4	4 - 5/8	4 7/8	1 1/8	2 1/8	1 1/8	1 1/8	3 3/4	4 - 3/4	4 7/8	1 1/8	2 1/8	1 1/8	1 1/8	3 1/2	4 - 3/4	1
1 1/4	4 7/8	1 1/4	2 3/4	5/8	5/8	3 1/2	4 - 5/8	5 1/4	1 1/4	2 3/8	1 1/4	1 1/4	3 7/8	4 - 3/4	5 1/4	1 1/4	2 3/8	1 1/4	1 1/4	3 7/8	4 - 3/4	1 1/4
1 1/2	5	1 1/2	2 7/8	5/8	5/8	3 3/4	4 - 5/8	6 1/4	1 1/2	2 1/2	1 1/2	1 1/2	4 1/4	4 - 7/8	6 1/4	1 1/2	2 3/4	1 1/2	1 1/2	4 1/4	4 - 7/8	1 1/2
2	6	1 3/4	2 1/2	3/4	3/4	4 1/4	4 - 5/8	6 1/2	1 3/4	2 1/4	1 3/4	1 3/4	5	8 - 3/4	6 1/2	1 3/4	2 3/4	1 3/4	1 3/4	5	8 - 3/4	2
2 1/2	7	1 7/8	2 3/4	3/4	3/4	5 1/2	4 - 3/4	7 1/2	1 7/8	3	1 1/2	1 1/2	5 1/8	8 - 3/8	7 1/2	1 7/8	3 1/8	1 1/8	1 1/8	5 1/8	8 - 3/8	2 1/2
3	7 1/2	1 7/8	2 3/4	3/4	3/4	6	4 - 3/4	8 1/2	1 7/8	3 3/8	1 1/8	1 1/8	6 1/4	8 - 7/8	8 1/2	1 7/8	3 1/4	1 1/4	1 1/4	6 1/4	8 - 7/8	3
3 1/2	8 1/2	1 7/8	2 3/4	3/4	3/4	7	8 - 3/4	9	1 7/8	3 3/8	1 1/8	1 1/8	7 1/4	8 - 7/8	9	1 7/8	3 3/8	1 1/8	1 1/8	7 1/4	8 - 7/8	3 1/2
4	9	1 7/8	3	3/4	3/4	7 1/2	8 - 3/4	10	1 7/8	3 3/8	1 1/8	1 1/8	7 1/4	8 - 7/8	10	1 7/8	3 3/8	2	2	7 1/4	8 - 1	4
5	10	1 7/8	3 1/2	3/4	3/4	8 1/2	8 - 7/8	11	1 7/8	3 3/8	2	2	8 1/4	8 - 7/8	11	1 7/8	4	2 1/8	2 1/8	9 1/4	8 - 1	5
6	11	1 7/8	3 1/2	3/4	3/4	9 1/2	8 - 7/8	12 1/2	1 7/8	3 3/8	2 1/8	2 1/8	10 3/8	12 - 7/8	12 1/2	1 7/8	4 1/8	2 1/4	2 1/4	10 3/8	12 - 1	6
8	13 1/2	1 7/8	4	3/4	3/4	11 3/4	8 - 7/8	15	1 7/8	4 1/8	2 1/8	2 1/8	13	12 - 1	15	1 7/8	4 1/8	2 1/4	2 1/4	13	12 - 1 1/2	8
10	16	1 7/8	4	3/4	3/4	14 1/2	12 - 1	17 1/2	1 7/8	4 1/8	2 1/8	2 1/8	15 1/4	16 - 1 1/8	17 1/2	1 7/8	4 1/8	2 1/4	2 1/4	15 1/4	16 - 1 1/2	10
12	19	1 7/8	4 1/2	3/4	3/4	17	12 - 1	20 1/2	1 7/8	5 1/8	2 1/8	2 1/8	17 3/4	16 - 1 1/2	20 1/2	1 7/8	5 1/8	3 3/8	4 1/4	17 3/4	16 - 1 3/4	12
14	21	1 7/8	5	3/4	3/4	18 3/4	12 - 1 1/8	23	2 1/8	5 1/8	3	4 3/8	20 1/4	20 - 1 1/4	23	2 1/8	5 1/8	3 3/8	4 3/8	20 1/4	20 - 1 1/2	14
16	23 1/2	1 7/8	5	3/4	3/4	21 1/4	16 - 1 1/8	25 1/2	2 1/8	5 1/8	3 3/4	4 3/8	22 1/2	20 - 1 3/8	25 1/2	2 1/8	5 1/8	3 3/8	5	22 1/2	20 - 1 1/2	16
18	25	1 7/8	5 1/2	3/4	3/4	22 3/4	16 - 1 1/4	28	2 1/8	6 1/4	3 1/2	5 1/8	24 1/4	24 - 1 3/8	28	2 1/8	6 1/4	3 3/8	5 1/8	24 1/4	24 - 1 1/2	18
20	27 1/2	1 7/8	5 1/2	3/4	3/4	25	20 - 1 1/4	30 1/2	2 1/8	6 1/4	3 3/4	5 1/2	27	24 - 1 3/8	30 1/2	2 1/8	6 1/4	4	5 1/4	27	24 - 1 1/2	20
24	32	1 7/8	6	3/4	3/4	29 1/2	20 - 1 3/4	36	2 1/8	6 3/8	4 1/2	6	32	24 - 1 3/4	36	2 1/8	6 3/8	4 1/2	6 1/4	32	24 - 1 3/4	24
30	38 3/4	2 1/8	5 3/4	3/4	---	36	28 - 1 3/8	43	3 3/8	8 1/4	---	---	39 1/4	28 - 1 1/8	43	4	8 3/8	8 3/8	---	39 1/4	28 - 2 1/8	30
36	46	2 1/8	5 3/4	3/4	---	42 3/4	32 - 1 5/8	50	4 1/8	9 1/2	9 1/2	---	46	32 - 2 1/2	50	4 1/2	9 1/8	9 1/8	---	46	32 - 2 1/8	36

NPS	600 LB. FLANGES							900 LB. FLANGES							1500 LB. FLANGES								
	O	C	Weld Neck	Y Slip On Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C	Weld Neck	Y Slip On Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C	Weld Neck	Slip On Thrd.	Y Slip On Thrd.	Bolt Circle	No. and Size of Holes		
1/2	3 3/4	7/8	2 1/8	3/4	3/4	2 1/4	4 - 5/8	4 1/4	7/8	2 1/8	1 1/4	1 1/4	3 1/4	4 - 7/8	4 1/4	7/8	2 1/8	1 1/4	1 1/4	3 1/4	4 - 7/8	1/2	
3/4	4 1/8	1 1/8	2 1/4	1	1	3 1/4	4 - 3/4	5 1/8	1 1/8	2 1/4	1 1/4	1 1/4	3 3/4	4 - 7/8	5 1/8	1 1/8	2 1/4	1 1/4	1 1/4	3 1/4	4 - 7/8	3/4	
1	4 1/2	1 1/8	2 1/2	1 1/8	1 1/8	3 1/2	4 - 3/4	5 1/4	1 1/8	2 1/2	1 1/8	1 1/8	4	4 - 1	5 1/4	1 1/8	2 1/4	1 1/4	1 1/4	4	4 - 1	1	
1 1/4	5 1/4	1 1/4	2 3/4	1 1/8	1 1/8	3 3/4	4 - 3/4	6 1/8	1 1/4	2 1/2	1 1/8	1 1/8	4 3/8	4 - 1	6 1/4	1 1/4	2 1/4	1 1/4	1 1/4	4 3/8	4 - 1	1 1/4	
1 1/2	6 1/8	1 1/2	2 3/4	1 1/4	1 1/4	4 1/2	4 - 7/8	7	1 1/4	3 1/4	1 1/4	1 1/4	4 1/4	4 - 1 1/8	7	1 1/4	3 1/4	1 1/4	1 1/4	4 1/4	4 - 1 1/8	1 1/2	
2	6 1/2	1 1/2	2 3/4	1 1/4	1 1/4	5	8 - 3/4	8 1/2	1 1/2	4	2 1/4	2 1/4	6 1/2	8 - 1	8 1/2	1 1/2	4	2 1/4	2 1/4	6 1/2	8 - 1	2	
2 1/2	7 1/2	1 1/2	3 1/8	1 1/8	1 1/8	5 1/4	8 - 7/8	9 1/8	1 1/2	4 1/8	2 1/2	2 1/2	7 1/2	8 - 1 1/8	9 1/8	1 1/2	4 1/8	2 1/2	2 1/2	7 1/2	8 - 1 1/8	2 1/2	
3	8 1/4	1 1/2	3 1/4	1 1/8	1 1/8	6 1/4	8 - 7/8	9 1/2	1 1/2	4	2 1/4	1 1/4	7 1/2	8 - 1	10 1/8	1 1/2	4 1/8	2 1/2	2 1/2	8	8 - 1 1/4	3	
3 1/2	9	1 1/2	3 3/8	1 1/8	1 1/8	7 1/4	8 - 1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3 1/2	
4	10 1/4	1 1/2	4	2 1/8	2 1/8	8 1/2	8 - 1	11 1/2	1 1/2	4 1/4	2 1/4	2 1/4	8 1/4	8 - 1 1/4	12 1/4	1 1/2	4 1/8	3 3/8	3 3/8	9 1/2	8 - 1 1/4	4	
5	13	1 1/2	4 1/2	2 3/8	2 3/8	10 1/2	8 - 1 1/8	13 1/4	2	5	3 1/8	3 1/8	11	8 - 1 3/8	14 1/4	1 1/2	4 1/8	4 1/8	4 1/8	11 1/2	8 - 1 1/2	5	
6	14	1 1/2	4 3/4	2 3/8	2 3/8	11 1/2	12 - 1 1/8	15	2 1/8	5 1/2	3 3/8	3 3/8	12 1/2	12 - 1 1/4	15 1/2	1 1/2	4 1/8	4 1/8	4 1/8	12 1/2	12 - 1 1/2	6	
8	16 1/2	1 1/2	5 1/4	3	3	13 1/4	12 - 1 1/4	18 1/2	2 1/2	6 1/4	4	4 1/2	15 1/2	12 - 1 1/2	19	1 1/2	4 1/8	4 1/8	4 1/8	15 1/2	12 - 1 3/8	8	
10	20	1 1/2	6	3 1/8	4 3/8	17	1 - 1 3/8	21 1/2	2 1/2	7 1/4	4 1/2	5	18 1/2	16 - 1 1/2	23	1 1/2	4 1/8	4 1/8	4 1/8	19	12 - 2	10	
12	22	1 1/2	6 1/8	3 3/8	4 3/8	19 1/4	20 - 1 3/8	24	3 1/4	7 1/4	4 3/8	5 1/4	21	20 - 1 1/2	26 1/2	1 1/2	4 1/8	4 1/8	4 1/8	22 1/2	16 - 2 1/8	12	
14	23 3/4	2 1/8	6 1/2	3 1/2	5	20 3/4	20 - 1 1/2	25 1/4	3 3/8	8 1/8	5 1/4	6 1/4	22	20 - 1 1/8	29 1/2	1 1/2	4 1/8	4 1/8	4 1/8	25	16 - 2 3/8	14	
16	27	3	7	4 1/8	5 1/2	23 3/4	20 - 1 3/4	27 1/4	3 1/2	8 1/2	5 1/4	6 1/2	24 1/4	20 - 1 3/4	32 1/2	1 1/2	4 1/8	4 1/8	4 1/8	27 1/4	16 - 2 3/4	16	
18	29 1/4	3 1/4	7 1/4	4 3/8	6	25 1/4	20 - 1 3/4	31	4	9	6	7 1/2	27	20 - 2	36	1 1/2	4 1/8	4 1/8	4 1/8	30 1/2	16 - 2 7/8	18	
20	32	3 1/2	7 1/2	5	6 1/2	28 1/2	24 - 1 3/4	33 3/4	4 1/4	9 1/4	6 1/4	8 1/4	29 1/2	20 - 2 1/8	38 1/4	1 1/2	4 1/8	4 1/8	4 1/8	32 1/2	16 - 3 1/8	20	
24	37	4	8	5 1/2	7 1/4	33	24 - 2	41	5 1/2	11 1/4	8	10 1/4	35 1/2	20 - 2 1/2	46	1 1/2	4 1/8	4 1/8	4 1/8	39	16 - 3 3/4	24	
30	44 1/2	4 1/2	9 1/4	6 1/4	---	40 1/4	28 - 2 1/8	48 1/2	5 1/4	12 1/4	12 1/4	---	42 3/4	20 - 3 1/8	---	---	---	---	---	---	---	---	30
36	51 3/4	4 1/2	11 1/8	6 1/4	---	47	28 - 2 3/8	57 1/2	6 1/4	14 1/4	14 1/4	---	50 1/4	20 - 3 3/8	---	---	---	---	---	---	---	---	36

NPS	2500 LB. FLANGES														WELDING NECK FLANGE BORES (O)													
	O	C	Weld Neck	Y Slip On Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C	Weld Neck	Y Slip On Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	Outside Diam.	Light Wall	Sched. 20	Sched. 30	Double Std. Wall	Sched. 40	Sched. 60	Extra Strong	Sched. 80	Sched. 100	Sched. 120	Sched. 140	Sched. 160	Extra Strong
1/2	5 1/4	1 3/16	2 1/8	1 1/8	1 1/8	3 1/2	4 - 1/8	0.840	0.674	---	---	0.622	0.622	---	0.564	0.546	---	---	---	0.622	0.622	---	0.564	0.546	---	---	0.464	0.252
3/4	5 1/2	1 1/4	3 1/8	1 1/8	1 1/8	3 3/4	4 - 1/8	1.050	0.884	---	---	0.824	0.824	---	0.742	0.742	---	---	---	0.824	0.824	---	0.742	0.742	---	---	0.612	0.434
1	6 1/4	1 3/8	3 1/2	1 1/8	1 1/8	4 1/4	4 - 1	1.315	1.097	---	---	1.049	1.049	---	0.957	0.957	---	---	---	1.049	1.049	---	0.957	0.957	---	---	0.815	0.599
1 1/4	7 1/4	1 1/2	3 3/4	1 1/8	1 1/8	5 1/4	4 - 1 1/8	1.680	1.442	---	---	1.380	1.380	---	1.278	1.278	---	---	---	1.380	1.380	---	1.278	1.278	---	---	1.160	0.896
1 1/2	8	1 1/2	4 1/8	1 1/8	1 1/8	5 3/4	4 - 1 1/4	1.900	1.682	---	---	1.610	1.610	---	1.500	1.500	---	---	---	1.610	1.610	---	1.500	1.500	---	---	1.338	1.100
2	9 1/4	2	5	1 1/8	1 1/8	6 1/4	8 - 1 1/8	2.375	2.157	---	---	2.067	2.067	---	1.939	1.939	---	---	---	2.067	2.067	---	1.939	1.939	---	---	1.687	