

DIMENSIONAL TOLERANCES • ASME B16.5

DIMENSIONAL TOLERANCES OF WELDING NECK FLANGES

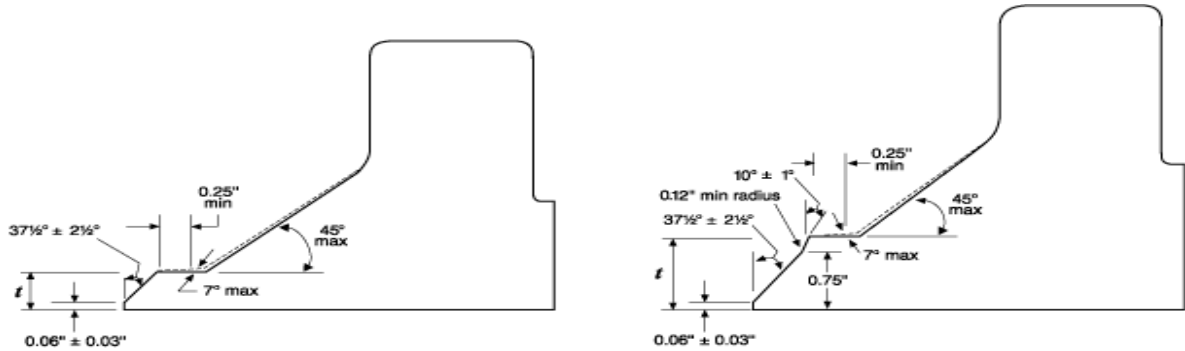
O	Outside Diameter	When O is 24" or less. When O is over 24".	±0.06" ±0.12"	±1.6 mm ±3.2 mm
R	Diameter of Contact Face	0.06" (1.6 mm) raised face. 0.25" (6.4 mm) raised face.	±0.03" ±0.02"	±0.8 mm ±0.5mm
A	Diameter of Hub at Point of Welding	NPS 5 and smaller. NPS 6 and larger.	+0.09", -0.03" +0.16", -0.03"	+2.4 mm, -0.8mm +4.0 mm, -0.8 mm
B	Inside Diameter	NPS 10 and smaller. NPS 12 to 18, inclusive. NPS 20 and larger.	±0.03" ±0.06" +0.12", -0.06"	±0.8 mm ±1.6 mm +3.2 mm, -1.6 mm
X	Diameter of Hub at Base	When Hub Base is 24" or less. When Hub Base is over 24".	±0.06" ±0.12"	±1.6 mm ±3.2 mm
C	Thickness	NPS 18 and smaller. NPS 20 and larger.	+0.12" +0.19"	+3.2 mm +4.8 mm
	Drilling and Facings	Bolt circle diameter Bolt Hole Spacing	±0.06" ±0.03"	±1.6 mm ±0.8 mm
	Eccentricity of Bolt Circle and Facing with respect to Bore	NPS 2 1/2 and smaller. NPS 3 and larger.	±0.03" ±0.06"	±0.8 mm ±1.6 mm
	Length Through Hub	NPS 10 and smaller. NPS 12 and larger.	±0.06" ±0.12"	±1.6 mm ±3.2 mm

DIMENSIONAL TOLERANCES OF SLIP-ON, LAP JOINT, SOCKET WELDING, THREADED and BLIND FLANGES

O	Outside Diameter	When O is 24" or less. When O is over 24".	±0.06" ±0.12"	±1.6 mm ±3.2 mm
R	Facings	0.06" (1.6 mm) raised face. 0.25" (6.4 mm) raised face.	±0.03" ±0.02"	±0.8 mm ±0.5 mm
B	Inside Diameter at face of Socket Welding Flanges	NPS 10 and smaller. NPS 12 to 18, inclusive. NPS 20 and larger.	±0.03" ±0.06" +0.12", -0.06"	±0.8 mm ±1.6 mm +3.2 mm, -1.6 mm
	Inside Diameter of Slip-On, Lap Joint, and Socket Welding	NPS 10 and smaller NPS 12 and larger	+0.03" +0.06"	+0.8 mm +1.6 mm
Q	Counter bore, Threaded Flanges	NPS 10 and smaller NPS 12 and larger	+0.03" +0.06"	+0.8 mm +1.6 mm
X	Diameter of Hub at Base	NPS 12" and smaller. NPS 14" and larger.	+0.09", -0.06" ±0.12"	+2.4 mm, -1.6 mm ±3.2 mm
C	Thickness	NPS 18 and smaller. NPS 20 and larger.	+0.12" +0.19"	+3.2 mm +4.8 mm
	Drilling	Bolt Circle Diameter Bolt Hole Spacing	±0.06" ±0.03"	±1.6 mm ±0.8 mm
	Eccentricity of Bolt Circle and Facing with respect to Bore	NPS 2 1/2 and smaller. NPS 3 and larger.	±0.03" ±0.06"	±0.8 mm ±1.6 mm
	Overall Length Through Hub	NPS 18 and smaller. NPS 20 and larger.	+0.12", -0.03" +0.19", -0.03"	+3.2 mm, -0.8 mm +4.8 mm, -1.6 mm

Dimensions of welding ends

According to ASME B16.5 and ASME B16.7



Nominal Pipe Size	Wall Thickness		Inside Diameter		Identification	
	in.	mm	in.	mm	Std.(1) XS; XXS	Schedule Nr.
1/2"	0.109	2.8	0.622	15.8	Std.	40
	0.147	3.7	0.546	13.9	XS	80
	0.188	4.8	0.464	11.8		160
	0.294	7.5	0.252	6.4	XXS	
3/4"	0.113	2.9	0.824	20.9	Std.	40
	0.154	3.9	0.742	18.8	XS	80
	0.219	5.6	0.612	15.5		160
	0.308	7.8	0.434	11.0	XXS	
1"	0.133	3.4	1.049	26.6	Std.	40
	0.179	4.5	0.957	24.3	XS	80
	0.250	6.4	0.815	20.7		160
	0.358	9.1	0.599	15.2	XXS	
1 1/4"	0.140	3.6	1.380	35.1	Std.	40
	0.191	4.9	1.278	32.5	XS	80
	0.250	6.4	1.160	29.5		160
	0.382	9.7	0.896	22.8	XXS	
1 1/2"	0.145	3.7	1.610	40.9	Std.	40
	0.200	5.1	1.500	38.1	XS	80
	0.281	7.1	1.338	34.0		160
	0.400	10.2	1.100	27.9	XXS	
2"	0.154	3.9	2.067	52.5	Std.	40
	0.218	5.5	1.939	49.3	XS	80
2"	0.344	8.7	1.687	42.8		160
	0.436	11.1	1.503	38.2	XXS	

2 1/2"	0.203	5.2	2.469	62.7	Std.	40
	0.276	7.0	2.323	59.0	XS	80
	0.375	9.5	2.125	54.0		160
	0.552	14.0	1.771	45.0	XXS	
3"	0.216	5.5	3.068	77.9	Std.	40
	0.300	7.6	2.900	73.7	XS	80
	0.438	11.1	2.624	66.6		160
	0.600	15.2	2.300	58.4	XXS	
3 1/2"	0.226	5.7	3.548	90.1	Std.	40
	0.318	8.1	3.364	85.4	XS	80
4"	0.237	6.0	4.026	102.3	Std.	40
	0.337	8.6	3.826	97.2	XS	80
	0.438	11.1	3.624	92.0		120
	0.531	13.5	3.438	87.3		160
	0.674	17.1	3.152	80.1	XXS	
5"	0.258	6.6	5.047	128.2	Std.	40
	0.375	9.5	4.813	122.3	XS	80
	0.500	12.7	4.563	115.9		120
	0.625	15.9	4.313	109.6		160
	0.750	19.1	4.063	103.2	XXS	
6"	0.280	7.1	6.065	154.1	Std.	40
	0.432	11.0	5.761	146.3	XS	80
	0.562	14.3	5.501	139.7		120
	0.719	18.3	5.189	131.8		160
	0.864	21.9	4.897	124.4	XXS	
8"	0.250	6.4	8.125	206.4		20
	0.277	7.0	8.071	205.0		30
	0.322	8.2	7.981	202.7	Std.	40
	0.406	10.3	7.813	198.5		60
	0.500	12.7	7.625	193.7	XS	80
	0.594	15.1	7.439	189.0		100
	0.719	18.3	7.189	182.6		120
	0.812	20.6	7.001	177.8		140
8"	0.875	22.2	6.875	174.6	XXS	
	0.906	23.0	6.813	173.1		160
10"	0.250	6.4	10.250	260.4		20

	0.307	7.8	10.136	257.5		30
	0.365	9.3	10.020	254.5	Std.	40
	0.500	12.7	9.750	247.7	XS	60
	0.594	15.1	9.564	242.9		80
	0.719	18.3	9.314	236.6		100
	0.844	21.4	9.064	230.2		120
	1.000	25.4	8.750	222.3	XXH	140
	1.125	28.6	8.500	215.9		160
12"	0.250	6.4	12.250	311.2		20
	0.330	8.4	12.090	307.1		30
	0.375	9.5	12.000	304.8	Std.	
	0.406	10.3	11.938	303.2		40
	0.500	12.7	11.750	298.5	XS	
	0.562	14.3	11.626	295.3		60
	0.688	17.5	11.376	289.0		80
	0.844	21.4	11.064	281.0		100
	1.000	25.4	10.750	273.1	XXH	120
	1.125	28.6	10.500	266.7		140
	1.312	33.3	10.126	257.2		160
14"	0.250	6.4	13.500	342.9		10
	0.312	7.9	13.376	339.8		20
	0.375	9.5	13.250	336.6	Std.	30
	0.438	11.1	13.124	333.3		40
	0.500	12.7	13.000	330.2	XS	
	0.594	15.1	12.814	325.5		60
	0.750	19.1	12.500	317.5		80
	0.938	23.8	12.126	308.0		100
	1.094	27.8	11.814	300.1		120
	1.250	31.8	11.500	292.1		140
	1.406	35.7	11.188	284.2		160
16"	0.250	6.4	15.500	393.7		10
	0.312	7.9	15.376	390.6		20
16"	0.375	9.5	15.250	387.4	Std.	30
	0.500	12.7	15.000	381.0	XS	40
	0.656	16.7	14.688	373.1		60

	0.844	21.4	14.314	363.6		80
	1.031	26.2	13.938	354.0		100
	1.219	31.0	13.564	344.5		120
	1.438	36.5	13.124	333.3		140
	1.594	40.5	12.814	325.5		160
18"	0.250	6.4	17.500	444.5		10
	0.312	7.9	17.376	441.4		20
	0.375	9.5	17.250	438.2	Std.	
	0.438	11.1	17.124	434.9		30
	0.500	12.7	17.000	431.8	XS	
	0.562	14.3	16.876	428.7		40
	0.750	19.1	16.500	419.1		60
	0.938	23.8	16.126	409.6		80
	1.156	29.4	15.688	398.5		100
	1.375	34.9	15.250	387.4		120
	1.562	39.7	14.876	377.9		140
	1.781	45.2	14.438	366.7		160
20"	0.250	6.4	19.500	495.3		10
	0.375	9.5	19.250	489.0	Std.	20
	0.500	12.7	19.000	482.6	XS	30
	0.594	15.1	18.814	477.9		40
	0.812	20.6	18.376	466.8		60
	1.031	26.2	17.938	455.6		80
	1.281	32.5	17.438	442.9		100
	1.500	38.1	17.000	431.8		120
	1.750	44.5	16.500	419.1		140
	1.969	50.0	16.064	408.0		160
24"	0.250	6.4	23.500	596.9		10
	0.375	9.5	23.250	590.6	Std.	20
	0.500	12.7	23.000	584.2	XS	
	0.562	14.3	22.876	581.1		30
	0.688	17.5	22.626	574.7		40
24"	0.969	24.6	22.064	560.4		60
	1.219	31.0	21.564	547.7		80
	1.531	38.9	20.938	531.8		100
	1.812	46.0	20.376	517.6		120

	2.062	52.4	19.876	504.9		140
	2.344	59.5	19.314	490.6		160
26"	0.312	7.9	25.376	644.6		10
	0.375	9.5	25.250	641.4	Std.	
	0.500	12.7	25.000	635.0	XS	20
28"	0.312	7.9	27.376	695.4		10
	0.375	9.5	27.250	692.2	Std.	
	0.500	12.7	27.000	685.8	XS	20
	0.625	15.9	26.750	679.5		30
30"	0.312	7.9	29.376	746.2		10
	0.375	9.5	29.250	743.0	Std.	
	0.500	12.7	29.000	736.6	XS	20
	0.625	15.9	28.750	730.3		30
32"	0.312	7.9	31.376	797.0		10
	0.375	9.5	31.250	793.8	Std.	
	0.500	12.7	31.000	787.4	XS	20
	0.625	15.9	30.750	781.1		30
	0.688	17.5	30.624	777.8		40
34"	0.312	7.9	33.376	847.8		10
	0.375	9.5	33.250	844.6	Std.	
	0.500	12.7	33.000	838.2	XS	20
	0.625	15.9	32.750	831.9		30
	0.688	17.5	32.624	828.6		40
36"	0.312	7.9	35.376	898.6		10
	0.375	9.5	35.250	895.4	Std.	
	0.500	12.7	35.000	889.0	XS	20
	0.625	15.9	34.750	882.7		30
	0.750	19.1	34.500	876.3		40
38"	0.375	9.5	37.250	946.2	Std.	
	0.500	12.7	37.000	939.8	XS	
40"	0.375	9.5	39.250	997.0	Std.	
40"	0.500	12.7	39.000	990.6	XS	
42"	0.375	9.5	41.250	1047.8	Std.	
	0.500	12.7	41.000	1041.4	XS	
44"	0.375	9.5	43.250	1098.6	Std.	



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	0.500	12.7	43.000	1092.2	XS	
46"	0.375	9.5	45.250	1149.4	Std.	
	0.500	12.7	45.000	1143.0	XS	
48"	0.375	9.5	47.250	1200.2	Std.	