

Number and Size of Bolts for Flanged Joints ASME B16.5

PRIMARY SERVICE PRESSURE RATING	Bolting	Flange Facing	NOMINAL PIPE SIZE																				
			1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24	
Class 150	Number		4	4	4	4	4	4	4	8	8	8	8	8	12	12	12	16	16	20	20		
	Diameter		1/2	1/2	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8	1	1	1 1/8	1 1/8	1 1/4	
	Length of Stud Bolts	1/16 in. RF	2 1/4	2 1/2	2 1/2	2 3/4	2 3/4	3 1/4	3 1/2	3 1/2	3 1/2	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 3/4	5 3/4	6 1/4	6 3/4
		RTJ			3	3 1/4	3 1/4	3 3/4	4	4	4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 3/4	5 3/4	6 1/4	6 3/4	7 1/4	
	Length of Mach. Bolts	1/16 in. RF	2	2	2 1/4	2 1/4	2 1/2	2 3/4	3	3	3	3	3 1/4	3 1/4	3 1/2	4	4	4 1/2	4 1/2	5	5 1/2	6	
Ring No.				R15	R17	R19	R22	R25	R29	R33		R36	R40	R43	R48	R52	R56	R59	R64	R68	R72	R76	
Class 300	Number		4	4	4	4	8	8	8	8	8	12	12	16	16	20	20	24	24	24	24		
	Diameter		1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	3/4	3/4	3/4	3/4	7/8	1	1 1/8	1 1/8	1 1/4	1 1/4	1 1/4	1 1/4	
	Length of Stud Bolts	1/16 in. RF	2 1/2	3	3	3 1/4	3 1/2	3 1/2	4	4 1/4	4 1/4	4 1/2	4 3/4	4 3/4	5 1/2	6 1/4	6 3/4	7	7 1/2	7 3/4	8	9	
		RTJ	3	3 1/2	3 1/2	3 3/4	4	4	4 1/2	4 3/4	5	5	5 1/4	5 1/2	6	6 3/4	7 1/4	7 1/2	8	8 1/4	8 3/4	10	
	Length of Mach. Bolts	1/16 in. RF	2 1/4	2 1/2	2 1/2	2 3/4	3	3	3 1/4	3 1/2	3 3/4	3 3/4	4 1/4	4 1/4	4 3/4	5 1/2	5 3/4	6 1/4	6 1/2	6 3/4	7 1/4	8	
Ring No.		R11	R13	R16	R18	R20	R23	R26	R31	R34	R37	R41	R45	R49	R53	R57	R61	R65	R69	R73	R77		
Class 400	Number		4	4	4	4	8	8	8	8	8	12	12	16	16	20	20	24	24	24	24		
	Diameter		1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	7/8	7/8	7/8	7/8	1	1 1/8	1 1/4	1 1/4	1 3/8	1 3/8	1 1/2	1 3/4	
	Length of Stud Bolts	1/4 in. RF	3	3 1/2	3 1/2	3 3/4	4 1/4	4 1/4	4 3/4	5	5 1/2	5 1/2	5 3/4	6	6 3/4	7 1/2	8	8 1/4	8 3/4	9	9 1/2	10 1/2	
		M&F T&G	2 3/4	3 1/4	3 1/4	3 1/2	4	4	4 1/2	4 3/4	5 1/4	5 1/4	5 1/4	5 3/4	6 1/2	7 1/4	7 3/4	8	8 1/2	8 3/4	9 1/4	10 1/4	
		RTJ	3	3 1/2	3 1/2	3 3/4	4 1/4	4 1/4	4 3/4	5	5 1/2	5 1/2	5 3/4	6	6 3/4	7 1/2	8	8 1/4	8 3/4	9	9 3/4	11	
Ring No.		R11	R13	R16	R18	R20	R23	R26	R31	R34	R37	R41	R45	R49	R53	R57	R61	R65	R69	R73	R77		
Class 600	Number		4	4	4	4	8	8	8	8	8	12	12	16	20	20	20	20	20	20	20		
	Diameter		1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	7/8	7/8	1	1	1 1/8	1 1/4	1 1/4	1 3/8	1 1/2	1 5/8	1 5/8	1 7/8	
	Length of Stud Bolts	1/4 in. RF	3	3 1/2	3 1/2	3 3/4	4 1/4	4 1/4	4 3/4	5	5 1/2	5 3/4	6 1/2	6 3/4	7 1/2	8 1/2	8 3/4	9 1/4	10	10 3/4	11 1/4	13	
		M&F T&G	2 3/4	3 1/4	3 1/4	3 1/2	4	4	4 1/2	4 3/4	5 1/4	5 1/2	6 1/4	6 1/2	7 1/4	8 1/4	8 1/2	9	9 3/4	10 1/2	11	12 3/4	
		RTJ	3	3 1/2	3 1/2	3 3/4	4 1/4	4 1/4	4 3/4	5	5 1/2	5 3/4	6 1/2	6 3/4	7 3/4	8 1/2	8 3/4	9 1/4	10	10 3/4	11 1/2	13 1/4	
Ring No.		R11	R13	R16	R18	R20	R23	R26	R31	R34	R37	R41	R45	R49	R53	R57	R61	R65	R69	R73	R77		
Class 900	Number		4	4	4	4	8	8	8	8	8	12	12	16	20	20	20	20	20	24	24		
	Diameter		3/4	3/4	7/8	7/8	1	7/8	1	7/8		11/8	1 1/4	1 1/8	1 3/8	1 3/8	1 3/8	1 1/2	1 5/8	1 7/8	2	2 1/2	
	Length of Stud Bolts	1/4 in. RF	4 1/4	4 1/2	5	5	5 1/2	5 3/4	6 1/4	5 3/4		6 3/4	7 1/2	7 1/2	8 3/4	9 1/4	10	10 3/4	11 1/4	12 3/4	13 3/4	17 1/4	
		M&F T&G	4	4 1/4	4 3/4	4 3/4	5 1/4	5 1/2	6	5 1/2		6 1/2	7 1/4	7 1/4	8 1/2	9	9 3/4	10 1/2	11	12 1/2	13 1/2	17	
		RTJ	4 1/4	4 1/2	5	5	5 1/2	5 3/4	6 1/4	5 3/4		6 3/4	7 1/2	7 3/4	8 3/4	9 1/4	10	11	11 1/2	13 1/4	14 1/4	18	
Ring No.		R12	R14	R16	R18	R20	R24	R27	R31		R37	R41	R45	R49	R53	R57	R62	R66	R70	R74	R78		
Class 1500	Number		4	4	4	4	8	8	8	8	8	12	12	16	20	20	20	20	24	24	24		
	Diameter		3/4	3/4	7/8	7/8	1	7/8	1	1 1/8		1 1/4	1 1/2	1 3/8	1 5/8	1 7/8	2	2 1/4	2 1/2	2 3/4	3	3 1/2	
	Length of Stud Bolts	1/4 in. RF	4 1/4	4 1/2	5	5	5 1/2	5 3/4	6 1/4	7		7 3/4	9 3/4	10 1/4	11 1/2	13 1/4	14 3/4	16	17 1/2	19 1/2	21 1/4	24 1/4	
		M&F T&G	4	4 1/4	4 3/4	4 3/4	5 1/4	5 1/2	6	6 3/4		7 1/2	9 1/2	10	11 1/4	13	14 1/2	15 3/4	17 1/4	19 1/4	21	24	
		RTJ	4 1/4	4 1/2	5	5	5 1/2	5 3/4	6 1/4	7		7 3/4	9 3/4	10 1/2	12 3/4	13 1/2	15 1/4	16 3/4	18 1/2	20 3/4	22 1/4	25 1/2	
Ring No.		R12	R14	R16	R18	R20	R24	R27	R35		R39	R44	R46	R50	R54	R58	R63	R67	R71	R75	R79		
Class 2500	Number		4	4	4	4	8	8	8	8	8	12	12	16	20	20	20	20	24	24	24		
	Diameter		3/4	3/4	7/8	1	1 1/8	1	1 1/8	1 1/4		1 1/2	1 3/4	2	2	2 1/2	2 3/4						
	Length of Stud Bolts	1/4 in. RF	4 3/4	5	5 1/2	6	6 3/4	7	7 3/4	8 3/4		10	11 3/4	13 1/2	15	19 1/4	21 1/4						
		M&F T&G	4 1/2	4 3/4	5 1/4	5 3/4	6 1/2	6 3/4	7 1/2	8 1/2		9 3/4	11 1/2	13 1/4	14 3/4	19	21						
	RTJ	4 3/4	5	5 1/2	6	6 3/4	7	8	9		10 1/4	12 1/4	14	15 1/2	20	22							
Ring No.		R13	R16	R18	R21	R23	R26	R28	R32		R38	R42	R47	R51	R55	R60							

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PIPE SCHEDULES

Pipe size	O.D. inches	5S	5	10S	10	20	30	STD 40S	40	60	XH 80S	80	100	120	140	160	XXH
1/8	0.405			0.049 0.19	0.049 0.19			0.068 0.24	0.068 0.24		0.095 0.31	0.095 0.31					
1/4	0.540			0.065 0.33	0.065 0.33			0.088 0.43	0.088 0.43		0.119 0.54	0.119 0.54					
3/8	0.675	0.049 0.33		0.065 0.42	0.065 0.42			0.091 0.57	0.091 0.57		0.126 0.74	0.126 0.74					
1/2	0.840	0.065 0.54		0.083 0.67	0.083 0.67			0.109 0.85	0.109 0.85		0.147 1.09	0.147 1.09				0.187 1.31	0.294 1.72
3/4	1.050	0.065 0.68		0.083 0.86	0.083 0.86			0.113 1.13	0.113 1.13		0.154 1.48	0.154 1.48				0.218 1.94	0.308 2.44
1	1.315	0.065 0.87		0.109 1.41	0.109 1.41			0.133 1.68	0.133 1.68		0.179 2.17	0.179 2.17				0.250 2.85	0.358 3.66
1 1/4	1.660	0.065 1.11		0.109 1.81	0.109 1.81			0.140 2.27	0.140 2.27		0.191 3.00	0.191 3.00				0.250 3.77	0.382 5.22
1 1/2	1.900	0.065 1.28		0.109 2.09	0.109 2.09			0.145 2.72	0.145 2.72		0.200 3.63	0.200 3.63				0.281 4.86	0.400 6.41
2	2.375	0.065 1.61		0.109 2.64	0.109 2.64			0.154 3.66	0.154 3.66		0.218 5.03	0.218 5.03				0.344 7.47	0.436 9.04
2 1/2	2.875	0.183 5.27		0.120 3.53	0.120 3.53			0.203 5.80	0.203 5.80		0.276 7.67	0.276 7.67				0.375 10.02	0.552 13.71
3	3.500	0.083 3.03		0.120 4.34	0.120 4.34			0.216 7.58	0.216 7.58		0.300 10.26	0.300 10.26				0.438 14.34	0.600 18.60
3 1/2	4.000	0.083 3.48		0.120 4.98	0.120 4.98			0.226 9.12	0.226 9.12		0.318 12.52	0.318 12.52					0.636 22.87
4	4.500	0.083 3.92		0.120 5.62	0.120 5.62			0.237 10.80	0.237 10.80		0.337 15.00	0.337 15.00	0.438 19.02			0.531 22.53	0.674 27.57
4 1/2	5.000							0.247 12.55			0.355 17.63						0.710 32.56
5	5.563	0.109 6.36		0.134 7.78	0.134 7.78			0.258 14.63	0.258 14.63		0.375 20.80	0.375 20.80	0.500 27.06			0.625 32.99	0.750 38.59
6	6.625	0.109 7.59		0.134 9.30	0.134 9.30			0.280 18.99	0.280 18.99		0.432 28.60	0.432 28.60	0.562 36.43			0.719 45.39	0.864 53.21
8	8.625	0.109 9.92		0.148 13.41	0.148 13.41	0.250 22.38	0.277 24.72	0.322 28.58	0.322 28.58	0.406 35.67	0.500 43.43	0.500 43.43	0.594 51.00	0.719 60.77	0.812 67.82	0.906 74.76	0.875 72.49
10	10.750	0.134 15.21		0.165 18.67	0.165 18.67	0.250 28.06	0.307 34.27	0.365 40.52	0.365 40.52	0.500 54.79	0.500 54.79	0.594 64.49	0.719 77.10	0.844 89.38	1.000 104.23	1.125 115.75	1.000 104.23
12	12.750	0.156 21.00	0.165 22.20	0.180 24.19		0.250 33.41	0.330 43.81	0.375 49.61	0.406 53.57	0.562 73.22	0.500 65.48	0.688 88.71	0.844 107.42	1.000 125.61	1.125 139.81	1.312 160.42	
14	14.000	0.156 23.09		0.188 27.76	0.250 36.75	0.312 45.65	0.375 54.62	0.375 54.62	0.438 63.50	0.594 85.13	0.500 72.16	0.750 106.23	0.938 130.98	1.094 150.93	1.250 170.37	1.406 189.29	
16	16.000	0.165 27.93		0.188 31.78	0.250 42.09	0.312 52.32	0.375 62.64	0.375 62.64	0.500 82.85	0.656 107.60	0.500 82.85	0.844 136.74	1.031 164.98	1.219 192.61	1.438 223.85	1.594 245.48	
18	18.000	0.165 31.46		0.188 35.80	0.250 47.44	0.312 58.99	0.438 82.23	0.375 70.65	0.562 104.76	0.750 138.30	0.500 93.54	0.938 171.08	1.156 208.15	1.375 244.37	1.562 274.48	1.781 308.79	
20	20.000	0.188 39.82		0.218 46.10	0.250 52.78	0.375 78.67	0.500 104.23	0.375 78.67	0.594 123.23	0.812 166.56	0.500 104.23	1.031 209.06	1.281 256.34	1.500 296.65	1.750 341.41	1.969 379.53	
22	22.000					0.375 86.69	0.500 114.92	0.375 86.61		0.875 197.60	0.500 114.80	1.125 251.05	1.250 277.27	1.625 353.94	1.875 403.38	2.125 451.49	
24	24.000			0.250 63.47	0.250 63.47	0.375 94.71	0.562 140.81	0.375 94.71	0.688 171.45	0.969 238.57	0.500 125.61	1.219 296.86	1.531 367.74	1.812 429.79	2.062 483.57	2.343 542.44	
26	26.000			0.312 85.68	0.500 136.30			0.375 102.72			0.500 136.30						
28	28.000			0.312 92.35	0.500 146.99	0.625 182.90		0.375 110.74			0.500 146.99						
30	30.000	0.250 79.51		0.312 99.02	0.312 99.02	0.500 157.68	0.625 196.26	0.375 118.76			0.500 157.68						
36	36.000	0.250 95.54		0.312 119.03	0.500 189.75	0.625 236.35		0.375 142.81	0.750 282.62		0.500 189.75						
42	42.000							0.375 166.86			0.500 221.82						
48	48.000							0.375 190.92			0.500 253.89						
54	54.000							0.375 214.97			0.500 285.96						
60	60.000							0.375 239.02			0.500 318.03						

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