ANSI 125 150 250 300 CLASS CAST IRON & DUCTILE IRON FLANGE (ASME B16.1 & B16.42) CHART DIMENSIONS & PRESSURE TEMPERATURE RATINGS

In terms of drilling and flange O.D. 125 class is the same as 150 class and 250 class if the same as 300 class. It should be noted that some soft seated valves such as knife gate, rubber lined butterfly or sluice gate valves may have a lower maximum working pressure than the flange is rated at.

ASME and AWWA standards provide dimensions for various classes of flanges. Given those dimensions, the standards development organisations establish pressure ratings for flanges and fittings based on the materials from which they're made and the temperatures are which they're used. These pressure classes of 125, 25, 300, etc. cause considerable confusion in the industry. This is because the classes often are interpreted as rated pressures of the flange; but nothing could be more further than the truth.

Instead, these classes are "designations" that generally represent a pressure and temperature for saturated steam. For example, an ASME B16.1 Class 125 flange is rated for 125 psi at 353ºF (178ºC), which is the boiling temperature for water at that pressure. As temperature increases, the pressure rating of the flange decreases. For example, a Class 150 flange is rated about 270 psi at ambient conditions (i.e. 100ºF or 38ºC), 180 psi at 400ºF (204ºC), 150 psi at 600ºF (316ºC), and 75 psi at 800ºF (427ºC). At ambient temperatures, it makes sense that the pressure ratings are higher than the saturated steam pressure. When the temperature rises, the rated pressure goes down and vice versa. Pressure and temperature tables in the applicable standards must be consulted to apply them to a piping system.

A general summary of flange pressure ratings versus temperatures is shown in Table 1. The ASME pressures represent non shock pressure ratings, as in stead pressures, not pressure spikes or cyclic water hammers.

- In all cases, as the maximum temperature increases, the pressure rating of the flange goes down. Metals are weaker at high temperatures.
- Most of the time, the pressure ratings do not match the class designation at 100ºF (38ºC).
- As the class designation increases, the pressure rating increases.
- Ductile iron flanges are rated higher than grey iron flanges.

The ASME standards contain many other standard pressure classes. But in the waterworks industry, Class 125 and Class 250 apply to grey iron flanges, while Class 150 and Class 300 apply to ductile iron, steel and stainless steel (ASME B16.1, ASME B16.42). The bolting patterns of Class 125 and Class 150 match, as do Class 250 and Class 300. It is important not to assume the rating of the fitting or valve is the same as the flange.

MSS or AWWA valve standards or/ and the materials the valve maker uses on the valve, can and does down rate the valve pressure rating despite what flanging the valve may be supplied with.

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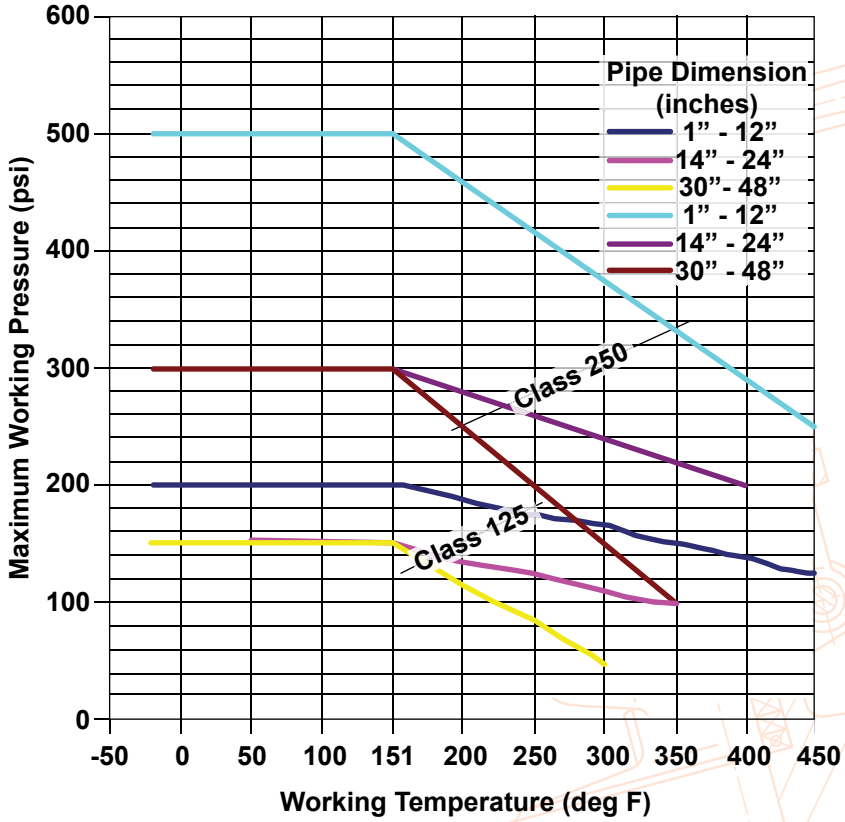
Table 1. Nonshock pressure ratings of gray and ductile iron flanges in psig

	ASME STANDARDS (ASME B16.1 and ASME B16.42								AWWA STANDARDS (AWWA C110)			
	Gray Iron ASTM A126				Ductile Iron ASTM A 395				Gray Iron		Ductile Iron	
	Class B				Gr 60-40-18				Class 25 or 30		Gr 70-50-05	
	CLASS 125		CLASS 250		CLASS 150		CLASS 300		CLASS 125		CLASS 125	
Max Temp.	NPS 1-12	NPS 14-24	NPS 1-12	NPS 14-24	NPS 1-12	NPS 14-24	NPS 1-12	NPS 14-24	NPS 3-12	NPS 14-24	NPS 3-12	NPS 14-24
38°C (100°F)	200	150	500	300	250	250	640	640	250	250	350*	350*
93°C (200°F)	190	135	460	280	235	235	600	600				
149°C (300°F)	165	110	375	240	215	215	565	565				

* With special gasket containing molded annular sealing elements

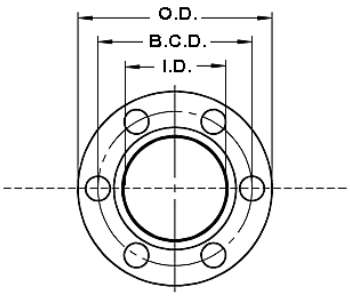
Maximum working pressures for cast iron flanged pipe fittings according ANSI B16.1:

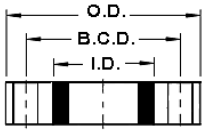


Maximum Working Pressure (psig)					
Temperature	Pressure Class				
	125			250	
	Pipe Size (inches)				
	1 - 12	14 - 24	30 - 48	1 - 12	14 - 24 [1)]
-28.89 to 65.6°C (-20 to 150°F)	200	150	150	500	300
93.3°C (200°F)	190	135	115	460	280
107°C (225°F)	180	130	100	440	270
121°C (250°F)	175	125	85	415	260
135°C (275°F)	170	120	65	395	250
149°C (300°F)	165	110	50	375	240
163°C (325°F)	155	105	-	355	230
177°C (350°F)	150	100	-	335	220
191°C (375°F)	145	-	-	315	210
204°C (400°F)	140	-	-	290	200
218°C (425°F)	130	-	-	270	-
232°C (450°F)	125	-	-	250	-

[1)] For liquid service - flanges only. Materials of construction ASTM A 126 Class B

Flange Dimensions





125 - 150 LB Drilling							
Nom. Dia.	Outside Dia (O.D.)	Bolt Circle Dia. (B.C.D.)	# of Bolts	Dia. of Holes ANSI B15.1 Class 125 ANSI B16.24	Dia of Holes ANSI B16.12	Dia of Holes AWWA C207-78 Table a Class D Table 2 Class D Table 3 Class E	Dia of Holes AWWA C207-78 Table 1 Class B Table 2 Class B
2	6.00	4.75	4	.75	-	.75	-
2.5	7.00	5.50	4	.75	-	.75	-
3	7.50	6.00	4	.75	-	.75	-
4	9.00	7.50	8	.75	.75	.75	.75
6	11.00	9.50	8	.875	.75	.875	.75
8	13.50	11.75	8	.875	.75	.875	.75
10	16.00	14.25	12	1.00	.75	1.00	.75
12	19.00	17.00	12	1.00	.75	1.00	.75
14	21.00	18.75	12	1.125	.875	1.125	.875
16	23.50	21.25	16	1.125	.875	1.125	.875
18	25.00	22.75	16	1.25	.875	1.25	.875
20	27.50	25.00	20	1.25	.875	1.25	.875
24	32.00	29.00	20	1.375	.875	1.375	.875
30	38.75	36.00	28	1.375	1.00	1.375	1.00
36	46.00	42.75	32	1.625	1.00	1.625	1.00
42	53.00	49.50	36	-	-	1.625	1.125
48	59.50	56.00	44	1.625	1.125	1.625	1.125
54	66.25	62.75	44	2.00	1.125	1.875	1.375
60	73.00	69.25	52	2.00	1.25	1.875	1.375

250 / 300 LB Drilling ANSI B16.1 Class 250 / ANSI B16.24 / ANSI B16.5 Class 300 / MSS SP-44 Class 300				
Nom. Dia.	Outside Dia. (O.D.)	Bolt Circle Dia. (B.C.D.)	# of Bolts	Dia. of Holes
2	6.50	5.00	8	.75
2.5	7.50	5.875	8	.875
3	8.25	6.625	8	.875
4	10.00	7.875	8	.875
6	12.50	10.625	12	.875
8	15.00	13.00	12	1.00
10	17.50	15.25	16	1.25
12	20.50	17.75	16	1.25
14	23.00	20.25	20	1.25
16	25.50	22.50	20	1.375
18	28.00	24.75	24	1.375
20	30.50	27.00	24	1.375
24	36.00	32.00	24	1.625
30	53.00	39.25	28	2.00*
36	50.00	46.00	32	2.25*
42	57.00*	52.75*	36*	2.25*
48	65.00*	60.75*	40*	2.25*
54	65.25	61.00	28	2.375
60	71.25	67.00	32	2.375

* Dimension shown does not meet MSS SP-44

Click here for our complete stock list of flanges, fittings and ANSI/ ASME valves 125 up to 2500 Class. We stock a full range of ball, check, gate, globe, needle, plug valves and strainers in cast iron, ductile iron, carbon steel, stainless steel, alloy steel, etc. We also stock undrilled flanged end valves to accommodate special drillings. Global Supply Line ships Worldwide.

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