

## ANSI B16.5 (ANSI STANDARD) MATERIAL SPECIFICATIONS

ASTM	Grade	Classification	CHEMICAL COMPOSITION								CHEMICAL PROPERTIES				
			C %	Mn %	P Max. %	S Max. %	Si %	Ni %	Cr %	Mb %	T.S. Min. psi (kg/mm <sup>2</sup> )	Y.S. Min. psi (kg/mm <sup>2</sup> )	El. Min. %	Red Min. %	HB
A105		Carbon steel	MAX 0.35	0.60 ~ 1.05	0.035	0.040	MAX 0.35	MAX 0.40	MAX 0.30	MAX 0.12	70,000 (485)	36,000 (250)	22	30	MAX 187
A266	CL1	Carbon steel	MAX 0.30	0.40 ~ 1.05	0.025	0.025	0.15 ~ 0.35				60,000-85,000 (415-685)	30,000 (205)	23	38	
A266	CL2	Carbon steel	MAX 0.30	0.40 ~ 1.05	0.025	0.025	0.15 ~ 0.35				70,000-95,000 (485-655)	36,000 (250)	20	33	
A266	CL3	Carbon steel	MAX 0.35	0.80 ~ 1.35	0.025	0.025	0.15 ~ 0.35				70,000-95,000 (485-655)	36,000 (260)	20	33	
A266	CL4	Carbon steel	MAX 0.30	0.80 ~ 1.35	0.025	0.025	0.15 ~ 0.35				75,000-100,000 (515-690)	37,500 (260)	19	30	
A181	60	Carbon steel	MAX 0.35	MAX 1.10	0.05	0.05	0.10 ~ 0.35				60,000 (415)	30,000 (205)	22	35	
A181	70	Carbon steel	MAX 0.35	MAX 1.10	0.05	0.05	0.10 ~ 0.35				70,000 (485)	36,000 (250)	18	24	
A350	LF1	Carbon steel	MAX 0.30	0.60 ~ 1.35	0.035	0.04	0.15 ~ 0.30	MAX 0.40	MAX 0.30	MAX 0.12	60,000-85,000 (415-685)	30,000 (205)	25	38	
A350	LF2	Carbon steel	MAX 0.30	0.60 ~ 1.35	0.035	0.04	0.15 ~ 0.30	MAX 0.40	MAX 0.30	MAX 0.12	70,000-95,000 (485-655)	36,000 (250)	22	30	
A350	LF3	3 1/2 Ni	MAX 0.20	MAX 0.90	0.035	0.04	0.2 ~ 0.35	3.3 ~ 3.7	MAX 0.30	MAX 0.12	70,000-95,000 (485-655)	37,500 (260)	22	30	
A182	F1	1/2 Mo	MAX 0.28	0.6 ~ 0.90	0.045	0.045	0.15 ~ 0.30			0.44 ~ 0.65	70,000 (485)	40,000 (275)	20	30	143 ~ 192
A182	F5	5Cr 1/2 Mo	MAX 0.15	0.30 ~ 0.60	0.030	0.030	MAX 0.50	MAX 0.50	4.0 ~ 6.00	0.44 ~ 0.65	70,000 (485)	40,000 (275)	20	35	143 ~ 217
A182	F5a	5Cr 1/2 Mo	MAX 0.25	MAX 0.60	0.040	0.030	MAX 0.50	MAX 0.50	4.0 ~ 6.00	0.44 ~ 0.65	90,000 (620)	65,000 (450)	22	50	187 ~ 248
A182	F11-1	1 1/4 Cr 1/2 Mo	0.05 ~ 0.15	0.30 ~ 0.60	0.030	0.030	0.50 ~ 1.00		1.00 ~ 1.50	0.44 ~ 0.65	60,000 (415)	30,000 (205)	20	45	121 ~ 174
A182	F11-2	1 1/4 Cr 1/2 Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.50 ~ 1.00		1.00 ~ 1.50	0.44 ~ 0.65	70,000 (485)	40,000 (275)	20	30	143 ~ 207
A182	F11-3	1 1/4 Cr 1/2 Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.50 ~ 1.00		1.00 ~ 1.50	0.44 ~ 0.65	75,000 (515)	45,000 (310)	20	30	156 ~ 207
A182	F12-1 F12-2	1 Cr 1/2 Mo	0.05 ~ 0.15	0.30 ~ 0.60	0.045	0.045	MAX 0.50		0.80 ~ 1.25	0.44 ~ 0.65	60,000 (415)	32,000 (220)	20	45	121 ~ 174
A182		1 Cr 1/2 Mo	0.10 ~ 0.20	0.30 ~ 0.80	0.040	0.040	0.10 ~ 0.60		0.80 ~ 1.25	0.44 ~ 0.65	70,000 (485)	40,000 (275)	20	30	143 ~ 207
A182	F22	2 1/4 Cr 1 Mo	MAX 0.15	0.30 ~ 0.60	0.040	0.040	MAX 0.50		2.00 ~ 2.50	0.87 ~ 1.13	75,000 (515)	45,000 (310)	20	30	156 ~ 207
A182	F304	18Cr-8Ni	MAX 0.08	MAX 2.00	0.045	0.030	MAX 1.00	8.00 ~ 11.00	18.00 ~ 20.00		75,000 (515)	30,000 (205)	30	50	
A182	F304L	18Cr-8Ni Low	MAX 0.030	MAX 2.00	0.045	0.030	MAX 1.00	8.00 ~ 13.00	18.00 ~ 20.00		70,000 (485)	25,000 (170)	30	50	
A182	F316		MAX 0.08	MAX 2.00	0.045	0.030	MAX 1.00	10.00 ~ 14.00	16.00 ~ 18.00	2.00 ~ 3.00	75,000 (515)	30,000 (205)	30	50	
A182	F316L		MAX 0.030	MAX 2.00	0.045	0.030	MAX 1.00	10.00 ~ 15.00	16.00 ~ 18.00	2.00 ~ 3.00	70,000 (485)	25,000 (170)	30	50	
A182	F321		MAX 0.08	MAX 2.00	0.045	0.030	MAX 1.00	9.00 ~ 12.00	17.00 ~ 19.00		75,000 (515)	30,000 (205)	30	50	
A182	F347		MAX 0.08	MAX 2.00	0.045	0.030	MAX 1.00	9.00 ~ 13.00	17.00 ~ 20.00		75,000 (515)	30,000 (205)	30	50	
A182	F51	22Cr-5.5Ni	MAX 0.030	MAX 2.00	0.030	0.020	MAX 1.00	4.5 ~ 6.5	21.00 ~ 23.00	2.50 ~ 3.50	90,000 (620)	65,000 (450)	25	45	

\*OTHER ELEMENTS: copper (0.40% MAX.), Vanadium (0.03% MAX.), Columbium (0.02% MAX.)

\*The sum of Cu, Ni, Cr and Mb shall not be exceed 1.00%

\*The sum of Cr and Mb shall not be exceed 0.32%

The SW/AMERICAN STANDARD FLANGES are manufactured conforming to the ASME B16.5 (Table 1A "LIST OF MATERIAL SPECIFICATIONS"), satisfying the above requirements.