

ASTM STANDARDS

Summary of the main ASTM Standards generally used in the petroleum industries.

ASTM	Grade	UNS Designation	CHEMICAL REQUIREMENTS %										MECHANICAL REQUIREMENTS							
			C	Mn	Pmax	Smax	Si	Ni	Cr	Mo	Others	Tensile Strength		Yield Strength		Elongation min%	Red. of Area min. %	Hardness	Impact Test at	
												Min. MPa	Min. ksi	Min. MPa	Min. ksi				°C	°F
A105			0.35 max	0.60-1.05	0.040	0.050	0.35 max	0.40 max	0.30 max	0.12 max	Cu<0.40 - V<0.03 Cb<0.02	485	70	250	36	22	30	137-187HB		
A106	B		0.30 max	0.29-1.06	0.035	0.035	0.10 min	0.40 max	0.40 max	0.15 max	Cu<0.40 - V<0.08	415	60	240	35	L30T16.5				
A182	F5a	K42544	0.25 max	0.60 max	0.040	0.030	0.50 max	0.50 max	4.0-6.0	0.44-0.55		620	90	450	65	22	50	187-248HB		
	F11	K11572	0.10-0.20	0.30-0.8	0.040	0.040	0.50-1.00		1.0-1.50	0.44-0.65		485	70	275	40	20	30	143-207HB		
	F22	K21590	0.05-0.15	0.30-0.6	0.040	0.040	0.50 max		2.0-2.50	0.87-1.13		515	75	310	45	20	30	156-207HB		
	F304	S30400	0.08 max	2.00 max	0.040	0.030	1.00 max	8.0-11.0	18.0-20.0			515	75	205	30	30	50			
	F304L	S30403	0.035 max	2.00 max	0.040	0.030	1.00 max	8.0-13.0	18.0-20.0			485	70	170	25	30	50			
	F316	S31600	0.08 max	2.00 max	0.040	0.030	1.00 max	10.0-14.0	16.0-18.0	2.00-3.00		515	75	205	30	30	50			
	F316L	S31603	0.035 max	2.00 max	0.040	0.030	1.00 max	10.0-15.0	16.0-18.0	2.00-3.00		485	70	170	25	30	50			
	F321	S32100	0.08 max	2.00 max	0.040	0.030	1.00 max	9.0-12.0	17.0 min		5C<Ti<0.70%	515	75	205	30	30	50			
	F347	S34700	0.08 max	2.00 max	0.040	0.030	1.00 max	9.0-13.0	17.0-20.0		10C<Cb+Ta<1.10%	515	75	205	30	30	50			
F51	S31803	0.03 max	2.00 max	0.030	0.020	1.00 max	4.5-6.5	21.0-23.0	2.5-3.5	N0.08-0.20	620	90	450	65	25	45				
A312	TP304	S30400	0.08 max	2.00 max	0.040	0.030	0.75 max	8.0-11.0	18.0-20.0			515	75	205	30	L35T25				
	TP304L	S30403	0.035 max	2.00 max	0.040	0.030	0.75 max	8.0-13.0	18.0-20.0			485	70	170	25	L35T25				
	TP316	S31600	0.08 max	2.00 max	0.040	0.030	0.75 max	11.0-14.0	16.0-18.0	2.00-3.00		515	75	205	30	L35T25				
	TP316L	S31603	0.035 max	2.00 max	0.040	0.030	0.75 max	10.0-15.0	16.0-18.0	2.00-3.00		485	70	170	25	L35T25				
	TP321	S32100	0.08 max	2.00 max	0.040	0.030	0.75 max	9.0-13.0	17.0-20.0		5C<Ti<0.70%	515	75	205	30	L35T25				
	TP347	S34700	0.08 max	2.00 max	0.040	0.030	0.75 max	9.0-13.0	17.0-20.0		10C<Cb+Ta<1%	515	75	205	30	L35T25				
A333	6		0.30 max	0.29-1.06	0.025	0.025	0.10 min				415	60	240	35	L30T16.5			-45	-50	
A335	P5	K41545	0.15 max	0.30-0.60	0.025	0.025	0.50 max		4.00-6.00	0.45-0.65		415	60	205	30	L30T20				
	P11	K11597	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00		1.00-1.50	0.44-0.65		415	60	205	30	L30T20				
	P22	K21590	0.05-0.15	0.30-0.60	0.025	0.025	0.50 max		1.90-2.60	0.87-1.13		415	60	205	30	L30T20			max197HB	
A350	LF2		0.30 max	1.35 max	0.035	0.040	0.15-0.30	0.40 max	0.30 max	0.12 max	Cu<0.40 Cb<0.02 V<0.03	485-655	70-95	250	36	22	30		-45.6	-50
A420	WPL6		0.30 max	0.39-1.06	0.030	0.030	0.10 min				415-585	60-85	240	35	L30T16.5			-45.6	-50	
A403	WP304		0.08 max	2.00 max	0.045	0.030	1.00 max	8.0-11.00	18.0-20.0			515	75	205	30	L28T20				
	WP304L		0.035 max	2.00 max	0.045	0.030	1.00 max	8.0-13.00	18.0-20.0			485	70	170	25	L28T20				
	WP347		0.08 max	2.00 max	0.045	0.030	1.00 max	9.0-13.00	17.0-20.0		a)	515	75	205	30	L28T20				
	WP316		0.08 max	2.00 max	0.045	0.030	1.00 max	10.0-14.00	16.0-18.0	2.00-3.00		515	75	205	30	L28T20				
	WP316L		0.035 max	2.00 max	0.045	0.030	1.00 max	10.0-15.00	16.0-18.0	2.00-3.00		485	70	170	25	L28T20				
	WP321		0.08 max	2.00 max	0.045	0.030	1.00 max	9.0-13.00	17.0-20.0		b)	515	75	205	30	L28T20				

a) Niobium + Tantalum content must be : not 10 times minus than Carbon content and not 1.10% more.

b) Titanium content must be : not 5 times minus than Carbon content and not 0.70% more.