

TABLE 1 Chemical Requirements

Grade	UNS Designation ^A	Composition, % ^B																
		Carbon	Manganese	Phosphorus	Sulfur	Silicon	Chromium	Nickel	Molybdenum	Titanium	Columbium	Tantalum, max	Nitrogen ^C	Vanadium	Copper	Cerium	Boron	Aluminum
...	S20400	0.030	7.0-9.0	0.045	0.030	1.00	15.0-17.0	1.50-3.00	...	...	...	...	0.15-0.30	...	...	...	...	...
TPXM-19	S20910	0.06	4.0-6.0	0.045	0.030	1.00	20.5-23.5	11.5-13.5	1.50-3.00	...	0.10-0.30	...	0.20-0.40	0.10-0.30	...	...	...	...
TPXM-10	S21900	0.08	8.0-10.0	0.045	0.030	1.00	19.0-21.5	5.5-7.5	...	...	...	...	0.15-0.40	...	...	...	...	
TPXM-11	S21904	0.04	8.0-10.0	0.045	0.030	1.00	19.0-21.5	5.5-7.5	...	...	...	...	0.15-0.40	...	...	...	...	
TPXM-29	S24000	0.08	11.5-14.5	0.060	0.030	1.00	17.0-19.0	2.3-3.7	...	...	...	...	0.20-0.40	...	...	...	...	
TP304	S30400	0.08	2.00	0.045	0.030	1.00	18.0-20.0	8.0-11.0	...	...	...	...	...	...	...	...	...	
TP304L	S30403	0.035 ^D	2.00	0.045	0.030	1.00	18.0-20.0	8.0-13.0	...	...	...	...	...	...	...	...	...	
TP304H	S30409	0.04-0.10	2.00	0.045	0.030	1.00	18.0-20.0	8.0-11.0	...	...	...	...	...	...	...	...	...	
...	S30415	0.04-0.06	0.80	0.045	0.030	1.00-2.00	18.0-19.0	9.0-10.0	...	...	...	...	0.12-0.18	...	...	0.03-0.08	...	
TP304N	S30451	0.08	2.00	0.045	0.030	1.00	18.0-20.0	8.0-18.0	...	...	...	...	0.10-0.16	...	...	...	...	
TP304LN	S30453	0.035	2.00	0.045	0.030	1.00	18.0-20.0	8.0-12.0	...	...	...	...	0.10-0.16	...	...	...	...	
...	S30600	0.018	2.00	0.02	0.02	3.7-4.3	17.0-18.5	14.0-15.5	0.20	...	...	...	...	0.50 max	...	...	...	
...	S30615	0.16-0.24	2.00	0.030	0.03	3.2-4.0	17.0-19.5	13.5-16.0	...	...	...	...	...	...	...	...	...	
...	S30815	0.05-0.10	0.80	0.040	0.030	1.40-2.00	20.0-22.0	10.0-12.0	...	...	...	...	0.14-0.20	...	...	0.03-0.08	0.80-1.50	
TP309S	S30908	0.08	2.00	0.045	0.030	1.00	22.0-24.0	12.0-15.0	0.75	...	...	...	...	...	...	...	...	
TP309H	S30909	0.04-0.10	2.00	0.045	0.030	1.00	22.0-24.0	12.0-15.0	...	...	...	...	...	...	...	...	...	
TP309Cb	S30940	0.08	2.00	0.045	0.030	1.00	22.0-24.0	12.0-16.0	0.75	...	10 × C min, 1.10 max	...	...	...	...	...	...	
TP309HCb	S30941	0.04-0.10	2.00	0.045	0.030	1.00	22.0-24.0	12.0-16.0	0.75	...	10 × C min, 1.10 max	...	...	...	...	...	...	
TP310S	S31002	0.015	2.00	0.020	0.015	0.15	24.0-26.0	19.0-22.0	0.10	...	...	...	0.10	...	...	...	...	
TP310H	S31008	0.08	2.00	0.045	0.030	1.00	24.0-26.0	19.0-22.0	0.75	...	...	...	...	...	...	...	...	
TP310Cb	S31009	0.04-0.10	2.00	0.045	0.030	1.00	24.0-26.0	19.0-22.0	...	...	...	...	...	...	...	...	...	
TP310HCb	S31040	0.08	2.00	0.045	0.030	1.00	24.0-26.0	19.0-22.0	0.75	...	10 × C min, 1.10 max	...	...	...	...	...	...	
TP310HCb	S31041	0.04-0.10	2.00	0.045	0.030	1.00	24.0-26.0	19.0-22.0	0.75	...	10 × C min, 1.10 max	...	...	...	...	...	...	
...	S31050	0.025	2.00	0.020	0.015	0.4	24.0-26.0	20.5-23.5	1.6-2.6	...	...	...	0.09-0.15	...	...	...	...	
...	S31254	0.020	1.00	0.030	0.010	0.80	19.5-20.5	17.5-18.5	6.0-6.5	...	...	...	0.18-0.22	...	0.50-1.00	...	...	
...	S31272	0.08-0.12	1.5-2.00	0.030	0.015	0.25-0.75	14.0-16.0	14.0-16.0	1.00-1.40	0.30-0.60	...	...	...	...	...	0.004-0.008	...	
TP316	S31600	0.08	2.00	0.045	0.030	1.00	16.0-18.0	11.0-14.0 ^E	2.00-3.00	...	...	...	...	...	...	...	...	
TP316L	S31603	0.035 ^D	2.00	0.045	0.030	1.00	16.0-18.0	10.0-14.0	2.00-3.00	...	...	...	...	...	...	...	...	
TP316H	S31609	0.04-0.10	2.00	0.045	0.030	1.00	16.0-18.0	11.0-14.0 ^E	2.00-3.00	...	...	...	...	...	...	...	...	
...	S31635	0.08	2.00	0.045	0.030	0.75	16.0-18.0	10.0-12.0	2.00-3.00	5× (C+N) min, 0.70	...	...	0.10	...	...	...	...	
TP316N	S31651	0.08	2.00	0.045	0.030	1.00	16.0-18.0	11.0-14.0 ^E	2.00-3.00	...	...	...	0.10-0.16	...	...	...	...	
TP316LN	S31653	0.035	2.00	0.045	0.030	1.00	16.0-18.0	11.0-14.0 ^E	2.00-3.00	...	...	...	0.10-0.16	...	...	...	...	
TP317	S31700	0.08	2.00	0.045	0.030	1.00	18.0-20.0	11.0-14.0	3.0-4.0	...	...	...	...	...	...	...	...	
TP317L	S31703	0.035	2.00	0.045	0.030	1.00	18.0-20.0	11.0-15.0	3.0-4.0	...	...	...	...	...	...	...	...	
...	S31725	0.03	2.00	0.040 ^F	0.030	1.00	18.0-20.0	13.5-17.5	4.0-5.0	...	...	...	0.10	...	0.75	...	...	
...	S31726	0.03	2.00	0.040 ^F	0.030	1.00	17.0-20.0	14.5-17.5	4.0-5.0	...	...	...	0.10-0.20	...	0.75	...	...	
TP321	S32100	0.08	2.00	0.045	0.030	1.00	17.0-19.0	9.0-12.0	...	G	...	...	0.10	...	...	...	...	
TP321H	S32109	0.04-0.10	2.00	0.045	0.030	1.00	17.0-19.0	9.0-12.0	...	H	...	...	...	...	...	...	...	

TABLE 4 Tensile Requirements

Grade	UNS Designation	Tensile Strength, min ksi [MPa]	Yield Strength, min ksi [MPa]
...	S20400	95 [635]	48 [330]
TPXM-19	S20910	100 [690]	55 [380]
TPXM-10	S21900	90 [620]	50 [345]
TPXM-11	S21904	90 [620]	50 [345]
TPXM-29	S24000	100 [690]	55 [380]
TP304	S30400	75 [515]	30 [205]
TP304L	S30403	70 [485]	25 [170]
TP304H	S30409	75 [515]	30 [205]
...	S30415	87 [600]	42 [290]
TP304N	S30451	80 [550]	35 [240]
TP304LN	S30453	75 [515]	30 [205]
...	S30600	78 [540]	35 [240]
...	S30615	90 [620]	40 [275]
...	S30815	87 [600]	45 [310]
TP309S	S30908	75 [515]	30 [205]
TP309H	S30909	75 [515]	30 [205]
TP309Cb	S30940	75 [515]	30 [205]
TP309HCb	S30941	75 [515]	30 [205]
TP310S	S31002	73 [500]	30 [205]
TP310H	S31008	75 [515]	30 [205]
TP310Cb	S31009	75 [515]	30 [205]
TP310HCb	S31040	75 [515]	30 [205]
...	S31050:	75 [515]	30 [205]
t ≤ 0.25 in.		84 [580]	39 [270]
t > 0.25 in.		78 [540]	37 [255]
...	S31254:	98 [675]	45 [310]
t ≤ 0.187 in. [5.00 mm]		95 [655]	45 [310]
t > 0.187 in. [5.00 mm]		65 [450]	29 [200]
TP316	S31600	75 [515]	30 [205]
TP316L	S31603	70 [485]	25 [170]
TP316H	S31609	75 [515]	30 [205]
...	S31635	75 [515]	30 [205]
TP316N	S31651	80 [550]	35 [240]
TP316LN	S31653	75 [515]	30 [205]
TP317	S31700	75 [515]	30 [205]
TP317L	S31703	75 [515]	30 [205]
...	S31725	75 [515]	30 [205]
...	S31726	80 [550]	35 [240]
TP321	S32100:	75 [515]	30 [205]
Welded			
Seamless:			
≤ 3/8 in.		75 [515]	30 [205]
> 3/8 in.		70 [485]	25 [170]
TP321H	S32109:	75 [515]	30 [205]
Welded			
Seamless:			
≤ 3/8 in.		75 [515]	30 [205]
> 3/8 in.		70 [480]	25 [170]
...	S32615	80 [550]	32 [220]
...	S32654	109 [750]	62 [430]
...	S33228	73 [500]	27 [185]
...	S34565	115 [795]	60 [415]
TP347	S34700	75 [515]	30 [205]
TP347H	S34709	75 [515]	30 [205]
TP347LN	S34751	75 [515]	30 [205]
TP348	S34800	75 [515]	30 [205]
TP348H	S34809	75 [515]	30 [205]
...	S35045	70 [485]	25 [170]

TABLE 2 Annealing Requirements

Grade or UNS Designation ^A	Heat Treating Temperature ^B	Cooling/Testing Requirements
All grades not individually listed below:	1900°F [1040°C]	C
TP321H, TP347H, TP348H		
Cold finished	2000°F [1100°C]	D
Hot finished	1925°F [1050°C]	D
TP304H, TP316H		
Cold finished	1900°F [1040°C]	D
Hot finished	1900°F [1040°C]	D
TP309H, TP309HCb, TP310H, TP310HCb	1900°F [1040°C]	D
S30600	2010-2140°F [1100-1170°C]	D
S30815, S31272	1920°F [1050°C]	D
S31254, S32654	2100°F [1150°C]	D
S33228	2050-2160°F [1120-1180°C]	D
S34565	2050-2140°F [1120-1170°C]	D
S35315	2010°F [1100°C]	D
N08367	2025°F [1110°C]	D
N08904	2000°F [1100°C]	D
N08926	2010°F [1100°C]	D

^A New designation established in accordance with Practice E 527 and SAE