

2.10 STAINLESS STEELS

Stainless steels combine good formability with excellent resistance to corrosion and elevated temperatures. Alone or in combination with other materials, low maintenance stainless steels enhance beauty, assure long life, save mass, and provide optimum performance in safety-related components.

The alloy characteristics and typical mechanical properties for a number of different stainless steel grades currently in use are shown in [Table 2.10-1](#) and [Table 2.10-2](#).

Table 2.10-1 Stainless steel alloy characteristics

	Ferritic 51400	Martensitic 51400	Austenitic 30300	Precipitation Hardening (PH)
Heat Treatable	No	Yes	No	Yes
Magnetic	Yes	Yes	No	Yes
Characteristic Microstructure	Ferrite	Martensite	Austenite	Martensite (as hardened)
Formability	B	D	A	C
Strength	D	A	C	B
Corrosion Resistance	C	D	A	B
Oxidation Resistance	A	D	B	D
Weldability	B	D	A	D

A = Highest, D = Lowest

Table 2.10-2 Nominal mechanical properties of stainless steels

SAE Grade	UNS Grade	Condition**	Yield Strength MPa (ksi)	Tensile Strength MPa (ksi)	Percent Elongation in 50mm (2 in.)	Hardness RB
30201	S20100	A	260 (38)	655 (95)	40	90
30301	S30100*	A	205 (30)	515 (75)	40	92
		1/4 H	515 (75)	860 (125)	---	---
		1/2 H	760 (110)	1035 (150)	---	---
		3/4 H	930 (135)	1205 (175)	---	---
		FH	965 (140)	1275 (185)	9	41C
30304	S30400	A	205 (30)	515 (75)	40	92
30304L	S30403	A	170 (25)	485 (70)	40	88
30316	S31600	A	205 (30)	515 (75)	40	95
41409	S40900	A	205 (30)	380 (55)	22	80
51410	S41000	A	275 (40)	485 (70)	20	80
51420	S42000	A	370 (54)	605 (88)	28	88
51440B	S44003	FH	425 (62)	740 (107)	18	96
51430	S43000	A	205 (30)	450 (65)	22	88
51439	S43900	A	205 (30)	450 (65)	22	88
	18 Cr-Cb	A	310 (45)	470 (68)	34	80
	17-4 PH	A	100 (145)	1100 (160)	15	28C

* Austenitic stainless steels, 200 and 300 series, can be cold worked to high tensile and yield strengths and yet retain good ductility and toughness. Data for various tempers of Type 30100 are given to illustrate this characteristic. Data on other grades are available from the steel supplier.

** A = Annealed, 1/4 H = 1/4 Hard, 1/2 H = 1/2 Hard, 3/4 H = 3/4 Hard, FH = Full Hard

