

## MECHANICAL PROPERTIES OF STEEL CONDITION, STRENGTH, HARDNESS & MACHINABILITY

### STAINLESS STEELS

AISI	Materials Condition	Tensile Strength ksi	Yield Strength ksi	Hardness		Machinability % of CD1212	Permiability	
				Brinall	Rockwell		Annealed	Drawn
Type 302HO	Annealed Bars	75-95	35-55	150-180	80-90B	60	Non-Magnetic	Non-Magnetic Slight
Type 303	Annealed Bars	85-95	30-40	160-180	83-95B	73	Non-Magnetic	Magnetic
Type 304	Annealed Bars	80-90	30-40	150-180	80-90B	45	Non-Magnetic	Slightly
Type 316	Annealed Bars	75-90	30-40	150-180	80-90B	40	Non-Magnetic	Non-Magnetic to Slightly
Type 410	Annealed Bars	75-100	35-45	150-200	80-90B	55	Magnetic	Magnetic
Type 416	Annealed Bars	80-100	55-65	190-220	90-95B	90	Magnetic	Magnetic
Type 17-4	Bars Cond. A	150	110	320	35C	45	Magnetic	Magnetic
	Cond. H 900	200	185	415	44C			
	Cond. H 1025	170	165	352	38C			

### CARBON STEELS - REPHOSPHORIZED & RESULPHURIZED

Grade	Type of Processing	Estimated Minium		Brinell Hardness	Average Machinability Rating (Cold Drawn 1112-100%)
		Tensile Strength psi	Yield Strength psi		
1006	Hot Rolled	43,000	24,000	86	
	Cold Drawn	48,000	41,000	95	50
1008	Hot Rolled	44,000	24,500	86	
	Cold Drawn	49,000	41,500	95	55
1010	Hot Rolled	47,000	26,000	95	
	Cold Drawn	53,000	44,000	105	55
1018	Hot Rolled	58,000	32,000	116	
	Cold Drawn	64,000	54,000	126	70
1022	Hot Rolled	62,000	34,000	121	
1035	Cold Drawn	69,000	58,000	137	70
1045	Hot Rolled	82,000	45,000	163	
	Cold Drawn	91,000	77,000	179	55
	ACD	85,000	73,000	170	65
1212	Hot Rolled	56,000	33,500	121	
	Cold Drawn	78,000	60,000	167	100
12L14	Hot Rolled	57,000	34,000	121	
	Cold Drawn	78,000	60,000	163	160
1215	Hot Rolled	57,000	34,000	121	
	Cold Drawn	75,000	65,000	163	160
1117	Hot Rolled	62,000	34,000	121	
	Cold Drawn	69,000	58,000	137	90
1141	Hot Rolled	94,000	51,500	187	
	Cold Drawn	105,100	88,000	212	70
1144	Hot Rolled	97,000	53,000	197	
	Cold Drawn	108,000	90,000	217	80

ACD - annealed, cold drawn.

All SAE 1100 series steels are rated on the basis for 0.10 max. silicon or coarse grain melting practice. The mechanical properties shown are expected minimums for the size ranging from 3/4" to 1 1/4".

REF: SAE J414, Handbook Supplement HS30.

### STAINLESS STEELS

SAE No.	Machinability	Condition	Range of Typical Hardnesses (Brinell)
	Rating		
4037	70	Annealed and Cold Drawn	174-217
8620	65	Hot Rolled and Cold Drawn	179-235
8630	70	Annealed and Cold Drawn	179-229
4130	70	Annealed and Cold Drawn	187-229
4140	65	Annealed and Cold Drawn	187-229

### HARDNESS RELATIONSHIP TO TENSILE STRENGTH

Tensile Strength (Aprox.) ksi	Rockwell Hardness No.		Hardness No.
	B Scale	C Scale	
56	65.7	-	111
60	69.8	-	121
65	74.0	-	131
71	78.7	-	143
76	82.9	-	156
81	86.0	-	167
85	87.8	-	174
90	90.7	-	187
95	92.8	-	197
100	94.6	-	207
105	96.4	-	217
110	97.8	20	226
114	99.0	22	237
117	100.0	23	243
120	-	24	247
122	-	25	253
125	-	26	258
128	-	27	264
132	-	28	271
135	-	29	279
138	-	30	286
142	-	31	294
145	-	32	301
149	-	33	311
153	-	34	319
157	-	35	327
162	-	36	336
168	-	37	344
171	-	38	353
176	-	39	362
181	-	40	371
188	-	41	381
194	-	42	390
201	-	43	400
208	-	44	409
215	-	45	421
222	-	46	432