

Properties of Steel

The information shown below is offered as a general guide to physical properties of steel in common use. Lower tensile properties are to be expected in large sections; the values of strength decrease as the size of the section increases. These values are not guaranteed and must **NOT** be used in specifying the raw materials or as a basis for acceptance or rejection of material. It must not be assumed that these properties will be obtained in all cases as they vary widely with permissible variations in analysis, size of section, rolling conditions, grain size and methods of heat treatment. Dependable physical properties can only be obtained through carefully controlled analysis and heat treatment.

Average Properties of Standard Steels

AISI Number	SAE Number	Condition of Steel	Strength in 1000 PSI		% Elong. in 2"	% Red. of Area	Hardness		Machinability % of B1112 CD
			Tensile	Yield			Brinell	Rockwell	
B1112	1112	COLD DRAWN BESSEMER	75-90	60-70	12-16	40-50	170-185	80-95B	100
C1018	1018	NATURAL HOT ROLLED	55-70	40-50	25-35	50-65	120-140	.....	55
		COLD DRAWN	70-85	50-70	18-25	45-55	160-180	80-90B	65
C1020	1020	1" RD. CARBURIZED AT 1700°F., COOLED IN BOX, REHEATED, QUENCHED - CORE PROPERTIES	90-100	60-80	10-22	35-50	200-230	93-98B	.....
		NATURAL HOT ROLLED	60-80	40-50	25-35	50-65	120-145	60-98B	50
		COLD DRAWN	70-80	45-70	15-25	45-60	120-160	70-85B	60
C1117	1117	NATURAL HOT ROLLED	60-70	37-47	20-30	45-60	135-150	.....	80
		COLD DRAWN	80-90	60-75	15-20	40-50	160-190	80-90B	90
C1035	1035	1" RD. CARBURIZED AT 1700°F., COOLED IN BOX, REHEATED, QUENCHED - CORE PROPERTIES	95-110	60-85	10-25	35-50	210-240	15-22C	.....
		NATURAL HOT ROLLED	75-85	40-55	18-25	40-55	155-175	.....	60
		COLD DRAWN	85-95	65-80	15-25	40-50	170-200	85-95B	65
C1040	1040	1" RD. QUENCHED, TEMPERED 1000°F.	95-105	70-80	20-25	55-60	195-220	93-98B	55
		NATURAL HOT ROLLED	80-90	45-55	18-25	35-50	165-185	.....	60
C1042	1042	COLD DRAWN	90-100	70-85	14-20	35-50	190-215	91-98B	62
		1" RD. QUENCHED, TEMPERED 1000°F.	100-110	75-85	15-25	45-60	210-240	17-23C	52
C1045	1045	NATURAL HOT ROLLED	85-95	50-60	15-25	35-50	175-205	.....	58
		COLD DRAWN	90-105	75-90	12-20	30-45	185-215	.....	60
C1050	1050	1" RD. QUENCHED, TEMPERED 1000°F.	105-120	80-90	15-25	40-60	215-250	.....	.....
		NATURAL HOT ROLLED	85-105	50-65	15-25	35-45	175-215	.....	55
C1141	1141	COLD DRAWN	90-110	75-90	12-20	30-45	195-230	95-99B	58
		1" RD. QUENCHED, TEMPERED 1000°F.	110-130	80-95	12-25	40-55	235-260	22-26C	47
C1144	1144	NATURAL HOT ROLLED	90-110	60-80	15-25	25-45	180-220	.....	65
		COLD DRAWN	100-120	85-105	8-18	20-50	195-230	.....	70
C1050	1050	1" RD. QUENCHED, TEMPERED 1000°F.	120-145	100-130	10-20	35-50	270-310	.....	.....
		NATURAL HOT ROLLED	95-110	60-85	15-25	30-45	200-240	.....	75
4140	4140	COLD DRAWN	100-120	90-115	7-17	20-45	210-245	17-23C	85
		1" RD. QUENCHED, TEMPERED 1000°F.	130-150	110-130	15	45	286-302	29-31C	.....
E52100	52100	NATURAL HOT ROLLED	95-110	55-70	15-20	25-40	210-325	.....	50
		1" RD. QUENCHED, TEMPERED 1000°F.	115-135	85-100	10-22	35-50	240-265	23-27C	.....
8620	8620	HOT ROLLED, ANNEALED	90-100	60-70	20-30	50-60	185-210	91-95B	55
		COLD DRAWN, ANNEALED	110-120	85-95	15-25	45-55	230-250	20-25C	65
8645	8645	HEAT TREATED, COLD DRAWN	140-155	125-140	12-20	45-55	270-300	26-30C	45
		1" RD. QUENCHED, TEMPERED 1000°F.	150-160	130-140	15-20	50-60	320-350	34-37C	.....
8742	8742	2" RD. QUENCHED, TEMPERED 1000°F.	145-155	125-135	15-20	50-60	320-345	33-36C	.....
		3" RD. QUENCHED, TEMPERED 1000°F.	130-145	115-125	15-20	55-65	280-310	28-32C	.....
8645	8645	HOT ROLLED, ANNEALED	100-110	75-85	20-25	50-60	210-235	.....	45
		1" RD. QUENCHED, TEMPERED 1000°F.	180-195	65-80	10-15	35-45	375-415	40-43C	.....
8742	8742	NATURAL HOT ROLLED	90-95	55-65	18-25	45-60	160-200	85-95B	55
		COLD DRAWN	90-105	65-80	15-25	40-50	185-215	90-96B	60-70
8645	8645	1" RD. CARBURIZED 1700°F., COOLED IN BOX, REHEATED, QUENCHED - CORE PROPERTIES	120-135	90-110	15-20	40-50	285-350	28-40C	.....
		NATURAL HOT ROLLED	105-125	55-75	15-25	35-50	220-270	20-28C	48-55
8742	8742	HOT ROLLED, ANNEALED	100-110	50-60	20-25	40-55	210-230	17-21C	54
		2" RD. QUENCHED, TEMPERED 1000°F.	140-150	110-125	15-20	45-55	300-320	30-34C	.....
8742	8742	3" RD. QUENCHED, TEMPERED 1000°F.	130-140	105-115	15-20	50-60	285-310	29-32C	.....
		NATURAL HOT ROLLED	110-125	50-70	15-25	35-50	230-270	22-28C	45-50
8742	8742	COLD DRAWN, ANNEALED	105-120	95-105	10-18	35-45	210-235	95-99B	60
		1" RD. QUENCHED, TEMPERED 1000°F.	155-165	135-145	15-20	45-52	330-335	35-38C	.....
8742	8742	2" RD. QUENCHED, TEMPERED 1000°F.	135-145	110-120	15-20	50-60	290-320	30-33C	.....