Alloy Properties

Choose your material properties **wisely.**

Alloy Grade

Choice of alloy listed from least to greatest cost.

Least Expensive

Most Expensive

Plain Carbon and Low Alloy Steels	8620, 4130, 4140, WCB, and 1035 are best choices due to high volume.
400 Series Stainless Steel	CA-15 (410), 440C are best choices. Specify 416 if necessary for machinability.
300 Series Stainless Steel	CF-8M (316), CF-3M (316L), CF-8 (304) are best choices. Specify CF-16F (303) if necessary for machinability.
17-4PH	Blend of corrosion resistance and strength.
Tool Steels	Costs vary widely depending on grade. S7, D2, H13 are commonly poured.
Copper Base Alloys	Silicon Bronze or Silicon Brass are best choices.
Monel	Choose based on end use.
Nickel Base	Alloy CW2M is good choice for corrosion resistance.
Cobalt Base	All grades pour well – choice is based on end use and cost.

Carbon, and Low Alloy Steels

Alloy	Condition	Tensile Strength (psi)	0.2% Yield Strength (psi)	% Elongation Range	Hardness Range or Max
IC 1010	Annealed	50-60,000	30-35,000	30-35	50-55 Rb
IC 1020	Annealed	60-70,000	40-45,000	25-40	80 Rb
IC 1025	Annealed	63-73,000	42-47,000	25-35	80 Rb
WCB*	Normalized	70-95,000	36-42,000	22-30	78-93 Rb
IC 1030	Annealed	65-75,000	45-50,000	20-30	75 Rb
	Hardened	85-150,000	60-150,000	0-15	20-50 Rc
IC 1035*	Annealed	70-80,000	45-55,000	20-30	80 Rb
	Hardened	90-150,000	85-150,000	0-15	25-52 Rc
IC 1045	Annealed	80-90,000	50-60,000	20-25	100 Rb
	Hardened	100-180,000	90-180,000	0-10	25-57 Rc
IC 1050	Annealed	90-110,000	50-65,000	20-25	100 Rb
	Hardened	125-180,000	100-180,000	0-10	30-60 Rc
IC 1060	Annealed	100-120,000	55-70,000	12-20	25 Rc
	Hardened	120-200,000	100-180,000	0-5	30-60 Rc
IC 4130*	Annealed	—	—	—	100 Rb
	Hardened	130-170,000	100-130,000	5-20	23-49 Rc
IC 4140*	Annealed	—	—	—	100 Rb
	Hardened	130-200,000	100-155,000	5-20	29-57 Rc
IC 4150	Annealed	—	—	—	100 Rb
	Hardened	140-200,000	120-180,000	5-10	25-58 Rc
IC 4330	Annealed	—	—	—	20 Rc
	Hardened	130-190,000	100-175,000	5-20	25-48 Rc
IC 4340	Annealed	—	—	—	20 Rc
	Hardened	130-200,000	100-180,000	5-20	20-55 Rc
IC 4620	Annealed	—	—	—	100 Rb
	Hardened	110-150,000	90-130,000	10-20	20-32 Rc
IC 6150	Annealed	—	—	—	100 Rb
	Hardened	140-200,000	120-180,000	5-10	30-60 Rc
IC 8620*	Annealed	—	—	—	100 Rb
	Hardened	100-130,000	80-110,000	10-20	20-45 Rc
IC 8630	Annealed	—	—	—	100 Rb
	Hardened	120-170,000	100-130,000	7-20	25-50 Rc
IC 8640	Annealed	—	—	—	20 Rc
	Hardened	130-200,000	100-180,000	5-20	30-60 Rc
IC 52100*	Annealed	—	—	—	25 Rc
	Hardened	180-230,000	140-180,000	1-7	30-65 Rc

* Signicast recommendations

400 Series Stainless Steels

Alloy (ANSI Equivalent)	Condition	Tensile Strength (psi)	0.2% Yield Strength (psi)	% Elongation Range	Hardness Range or Max
CA-15* (410)	Annealed	—	—	—	100 Rb
	Hardened	95-200,000	75-160,000	5-12	94 Rb-45 Rc
IC 416 (416)	Annealed	—	—	—	100 Rb
	Hardened	95-200,000	75-160,000	3-8	94 Rb-45 Rc
CA-40 (420)	Annealed	—	—	—	25 Rc
	Hardened	200-225,000	130-210,000	0-5	30-52 Rc
IC431 (431)	Annealed	—	—	—	30 Rc
	Hardened	100-160,000	75-105,000	5-20	20-40 Rc
IC 440A (440A)	Annealed				30 Rc
	Hardened				35-56 Rc
IC 440C* (440C)	Annealed				35 Rc
	Hardened				40-60 Rc
IC 17-4 (CB7CU-1)	Annealed	—	—	—	36 Rb
	Hardened	150-190,000	140-160,000	6-20	34-44 Rc
CD-4MCu	Annealed	100-115,000	75-85,000	20-30	94-100 Rb
	Hardened	135-145,000	100-120,000	010-25	29-32 Rc

* Signicast recommendations

300 Series Stainless Steels

Alloy (ANSI Equivalent)	Condition	Tensile Strength (psi)	0.2% Yield Strength (psi)	% Elongation Range	Hardness Rb Max
CF-3 (304L)	Annealed	70-85,000	40-50,000	35-50	90
CF-8 (304)*	Annealed	70-85,000	40-50,000	35-50	90
CH-20 (309)	Annealed	70-80,000	30-40,000	30-45	90
CK-20 (310)	Annealed	60-75,000	30-40,000	35-45	90
CF-3M (316L)*	Annealed	70-85,000	40-50,000	35-50	90
CF-8M (316)*	Annealed	70-85,000	40-50,000	35-50	90
IC 316F (316F)	Annealed	70-85,000	40-50,000	25-50	90
CF-16F (303)	Annealed	65-75,000	30-35,000	35-45	90
CF-8C (347)	Annealed	70-85,000	32-36,000	30-40	90
CN-7M (304L)	Annealed	65-75,000	25-35,000	35-45	90
HK	Annealed	65-75,000	35-45,000	10-20	100

* Signicast recommendations

Tool Steels

Alloy	HARDENED STEELS		
	Annealed w/Slow Cool Max.	Cycle Anneal Max.	Hardened Range
IC A-2	20 Rc	27 Rc	47-60
IC A-6	100 Rb		48-59
IC D-2		35 Rc	50-59
IC H-11	100 Rb		46-55
IC H-13	100 Rb		45-53
IC 1-M-2		30 Rc	61-63
IC M-2		30 Rc	61-63
IC O-1		100 Rb	44-57
IC S-1		100 Rb	44-57
IC S-4	100 Rb		42-53
IC S-5	100 Rb		37-59
IC S-7		100 Rb	35-57

Nickel Base Alloys

Alloy	Condition	Tensile Strength (psi)	0.2% Yield Strength (psi)	% Elongation Range	Hardness Range or Max
Alloy B	Annealed	75-85,000	50-60,000	8-12	90-100 Rb
Alloy C	Annealed	75-95,000	45-55,000	8-12	90 Rb-25 Rc
CW-2M	Annealed	72-87,000	40-45,000	20-30	75-90 Rb
Alloy X	As Cast	63-70,000	41-45,000	10-15	85-96 Rb
Monel A	As Cast	65-75,000	32-38,000	25-35	65-75 Rb
Monel S	Annealed	100-110,000	55-65,000	5-10	20-28 Rc
	Hardened	120-140,000	85-100,000	0	32-38 Rc
Monel E	As Cast	65-80,000	33-40,000	25-35	67-78 Rb

Cobalt Base Alloys

Alloy	Condition	Tensile Strength (psi)	0.2% Yield Strength (psi)	% Elongation Range	Hardness Rc Range
3	As Cast				48-53
6	As Cast				37-45
31	As Cast	105-130,000	75-90,000	6-10	20-30
93	As Cast				60-65

NOTE: This information is provided as a guideline only, not a specification. Any requirements for specific mechanical properties are beyond this standard and must be discussed individually.