

Machining Materials Guide

Type	General Characteristics	Alloy	Common Applications	Tolerances for a 1/2" Dia. Bar	Material Cost Factor	Machining Cost Factor
<u>Brass</u>	Low cost, low strength, heavy, free machining	CDA 360	Electronic hardware and contacts, fittings, numerous commercial products	+/- .0015	2.5 (High scrap return provides cost savings)	.6
<u>Copper Alloys</u>	Excellent electrical conductivity	TeCu, CA 145	Electrical contacts	+/- .0015	5.4	.7
	Higher strength and excellent electrical conductivity	BeCu alloy 25	Electrical contacts	+/- .002 (Can be ordered to +/- .0002)	30.0	.75
	Designed for machining	2011	Electronic hardware, endless commercial products	Cold finish +/- .0015	1.6	.6
	Improved strength	2024	Electronic hardware, aircraft components	+/- .0015	2.2	.7
<u>Aluminum</u>	Good formability, weldability, and corrosion resistance	6061	Electronic hardware	Cold finish +/- .0015	0.8	.75
	Higher strength	7075	Aircraft components	Extruded +/- .009 +/- .0015	2.3	
	Plain low carbon steel, poor machinability but good formability and weldability. Case harden only	1018	Rivets and parts requiring strong welds	Cold drawn +.000/.002	0.75	3.0
	Designed for good machinability Case harden only	1215	Parts needing better formability or weldability than 12L14	Cold drawn +.000/.002	0.95	1.5
<u>Steel</u>	Designed for excellent machinability Case hardening only	12L14	Endless commercial products; probably more pounds used in turned products than any other bar stock	Cold drawn +.000/.002	1	1
	Excellent machinability w/o lead (Biadded) Case hardening only	1215 Bi	Same as 12L14, non-leaded replacement for 12L14	Cold drawn +.000/.002	1.1	1
	Higher carbon, higher strength,	1137	Higher stress applications, gears, shafts,	Cold drawn	1.25	2.5

Type	General Characteristics	Alloy	Common Applications	Tolerances for a 1/2" Dia. Bar	Material Cost Factor	Machining Cost Factor
	direct hardening		studs, etc.	+ .000/- .003		
	Direct hardening	4140 or 4142	Higher stress applications needing the strength of an alloy	Cold drawn + .000/- .003	1.25	3.0
	Designed for better machining w/lead additive; direct hardening	41L40	Higher stress applications needing the strength of an alloy	Cold drawn + .000/- .003	1.4	2.7
<u>Alloy Steel</u>	.55% Ni, .50% Cr, .20% Mo, heat treatable and case hardening	8620	High stress applications needing the strength of an alloy.	Cold drawn + .000/.002 Cold finished	1.8	2.7
	Very high 1% carbon, .25% Ni, 1.4% Cr, .08% Mo	52100	Bearing applications	Spheroidize annealed +/- .006	2.0	5.1
	Designed for machining, non-magnetic	303	Electronic hardware, automotive, aerospace, medical instruments, and many applications requiring corrosion resistance	Cold finished +/- .002	4.5	2.7
	Better weldability and formability, slightly more corrosion resistant	304	Applications needing formability or weldability	Cold finished +/- .002	3.7	5.0
<u>Stainless Steel</u>	Better corrosion resistance	316	Medical implants and surgical instruments, aerospace	Cold finished +/- .002	4.3	5.6
	Free machining; less corrosion resistant than 300 series; can be heat treated	416	Applications that need less corrosion resistance, more hardness, or lower cost	Cold finished-annealed +/- .002	3.8	2.6
	High carbon, can harden to RC 60	440°C	Applications requiring stainless steel with highest hardness		5.9	5.0
	Excellent corrosion resistance and heat treatable	17-4 PH	Medical, aerospace, applications needing corrosion resistance and hardness	+/- .002	4.4	5.0