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sales@parts-badger.com | www.parts-badger.com | 331-223-4378

Copper, Brass & Bronze

	Alloying Elements	Properties	Popular Uses
High Copper Alloys	96% - 99.3% Copper Alloying Elements: Cadmium Beryllium Chromium Zirconium	High thermal and electrical conductivity. Lower strength and hardness than brasses and bronzes. More often casted than machined.	Wires, electrical components, roofing, screens, medical/dental
Brasses	55% - 95% Copper Main alloying element is Zinc (5% - 40%). Lead is often added to increase machinability	High strength, conductive, machinable and corrosion resistant. Zinc typically kept under 15% to maintain corrosion resistance.	Electrical components, radiators, hardware, cases, marine applications, valves, screws, nuts, keys
Bronzes	60% - 92% Coopper (typically ~88%) Main alloying element is Tin, Aluminum or Silicon.	High strength, thermal conductivity, hardness, corrosion resitance and low friction properties.	Bearings, tools, coins, sculptures, musical instruments, marine applications, forgings

Machining Copper, Brass and Bronze:

When referring to metals that are often used in machining, the term free machining or free cutting is often used. Free machining materials contain certain elements that add efficiencies such as higher machining speed, improved surface finish, smaller chips and longer tool life.

Lead is has been historically added to alloys to improve machinability and can act as a lubricant and assists in chip breaking. However with recent developments in the negative health implications of lead, free machining coppers, brasses and bronzes are being transitioned to contain sulfur or tellurium instead of lead.