

Material Information



Bronze C510

Introduction

Bronze C510, also known as C51000 Phosphor Bronze, is a copper-tin-phosphorus alloy known for its high strength, excellent fatigue resistance, spring properties, and corrosion resistance. It offers good cold-forming capabilities and maintains reliable mechanical performance under repeated loading, making it a practical material for sheet metal components that require flexibility, durability, and dimensional stability.

Advantages

High strength, excellent fatigue resistance, good spring properties, good corrosion resistance, and good cold formability. Bronze C510 can be processed through various sheet metal fabrication methods, including bending, stamping, blanking, punching, and shearing. Its ability to withstand repeated flexing makes it particularly suitable for spring components, electrical contacts, and precision-formed parts.

Disadvantages

Bronze C510 has lower electrical conductivity than pure copper, which may limit its suitability for applications requiring maximum electrical current-carrying efficiency. Its density is also relatively high compared with lightweight metals such as aluminum. In addition, the alloy can work-harden during repeated forming operations, potentially increasing forming forces and the risk of cracking if the material temper and forming conditions are not properly considered.

Tolerance

We offer tolerances as tight as $\pm 0.005"$. Tighter tolerances are available upon manual review.

Recommendation

The combination of high strength, fatigue resistance, spring properties, corrosion resistance, and cold formability makes Bronze C510 suitable for sheet metal components, spring contacts, electrical connectors, washers, diaphragms, and precision industrial parts. It is particularly appropriate for applications requiring reliable performance under repeated flexing, mechanical stress, or exposure to corrosive environments.

Material Specifications (For reference only.)	
Tensile strength	131 to 200MPa
Density	8.86 g/cm ³
Hardness	68 to 79 HB
Elongation at break	48% to 62%

Attention

Bronze C510 is well suited to cold-forming processes, but the material temper, sheet thickness, and bend radius should be considered when establishing forming parameters. Repeated or severe deformation can cause work hardening and increase the risk of cracking during subsequent forming operations. Appropriate tooling and controlled forming conditions are recommended to maintain dimensional accuracy and surface quality. Hot forming should also be carefully evaluated because this alloy has limited hot-forming capability.

Applications

3DSPRO finds people using Bronze C510 to make functional and precision-formed sheet metal components in the following industries and applications.

Electrical and electronic equipment:

Electrical connectors, spring contact blades, fuse clips, switch components, electronic connectors, and other parts requiring fatigue resistance and reliable electrical contact.

Industrial equipment:

Diaphragms, bellows, pressure-responsive components, perforated sheets, and other fabricated parts requiring durability and resistance to repeated mechanical loading.

Fasteners and mechanical components:

Lock washers, cotter pins, spring clips, fasteners, and other components requiring strength, elasticity, and reliable performance under repeated stress.

Precision instruments and control systems:

Bourdon tubes, flexible contact components, instrument parts, and other precision components requiring consistent mechanical behavior, fatigue resistance, and dimensional stability.