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# Alloy 510 - Phosphor Bronze

**Description:** 510 Alloy is the most widely used of the phosphor bronzes, which offer an optimum combinations of engineering properties like: high strength and ductility, superior fatigue and spring characteristics, excellent corrosion resistance, durability for severe service and good bearing qualities.

**Applications:** Typically used for bearings, bushings, gears, pinions, shafts, thrust washers and valve parts. It is also used for resistance wire, fuse clips, bellows and electronic parts.

| Nominal Composition: | Cu% | Sn% | P% |
|---|---|---|---|
| | 94.9% | 5.0% | 0.1% |

## Physical Properties - Age hardened products

| | English Units | Metric Units |
|---|---|---|
| Specific Gravity | 8.83 g/cu cm | |
| Coefficient of Thermal Expansion per °C | 17.80 x $10^{-6}$ (20-300°C) | |
| Thermal Conductivity | 40 Btu/ft²/ft.hr/°F @ 68°F | |
| Modulus of Elasticity - Tension | 16,000 ksi | |
| Electrical Conductivity at 68 °F | 15% IACS | |

## Tensile Strength: x Ksi (Kgf/mm² - Ksi x 0.7031)

| Temper | Tensile Strength: x Ksi (Kgf/mm² - Ksi x 0.7031) | Elongation in 50 mm (2 in.), % | Yield Strength: x Ksi (0.2% offset)(Kgf/mm² - Ksi x 0.7031) |
|---|---|---|---|
| Annealed | 46-56 | 55 | 24 |
| 1/4 Hard | 49-61 | 41 | 37 |
| 1/2 Hard | 58-73 | 24 | 57 |
| 3/4 Hard | 68-79 | 15 | 68 |
| Hard | 76-91 | 8 | 81 |
| Extra Hard | 88-103 | 4 | 93 |
| Spring | 95-110 | 3 | 100 |
| Extra Spring | 100-114 | 2 max. | 104 min. |

*To be used as a guideline only.