

# CuSn5

CuSn5 | C51000

CuSn5 is a solid solution strengthened copper alloy with 5% tin. The alloy is highly suitable for cold forming processes with high strength and hardness. It is corrosion resistant and has good solderability. It offers good electrical conductivity and is used in applications where a combination of conductivity and strength is of great importance.

## Comparable Standarts

| EN     | JIS   | UNS    |
|--------|-------|--------|
| CW451K | C5102 | C51000 |

## Chemical Composition %

| Cu  | Zn      | Sn      | Pb       | P        |
|-----|---------|---------|----------|----------|
| rem | 0.2 max | 4.5-5.5 | 0.02 max | 0.01-0.4 |

## Physical Properties

|                         |       |                       |
|-------------------------|-------|-----------------------|
| Melting Point           | 1049  | [°C]                  |
| Density                 | 8.9   | (g/cm <sup>3</sup> )  |
| Cp @ 20°C               | 0.377 | [kJ/kgK]              |
| Thermal Conductivity    | 96    | (W/mK)                |
| Electrical Conductivity | ≥17   | %IACS                 |
| Modules of Elasticity   | 120   | [GPa]                 |
| @20-300°C               | 18    | [10 <sup>-6</sup> /K] |

Note: The specified conductivity applies to the soft condition only.

Cp specific heat

$\alpha$  thermal expansion coefficient

## Fabrication Properties

|                        |                 |
|------------------------|-----------------|
| Cold Formability       | excellent       |
| Hot Formability        | not recommended |
| Soldering ability      | excellent       |
| Oxyacetylene welding   | fair            |
| Gas shield arc welding | good            |
| Resistance welding     | good            |
| Machining              | not recommended |
| Brazing                | excellent       |

## Electrical Conductivity

Electrical conductivity depends on chemical composition, the level of cold deformation, and grain size. High levels of deformation and small grain size reduce conductivity.

### Typical Uses

Automotive, electrical components, connectors, relays and conductor springs, clamps, springs, metal hose, bushings, mechanical and apparatus engineering.

### Corrosion Resistance

Bronze is resistant to natural and industrial atmospheres, as well as maritime air, potable and service water (if the flow rate is not excessive), seawater, non-oxidizing acids, alkaline solutions, and neutral saline environments.

However, bronze has low corrosion resistance to ammonia, halogenide, cyanides, hydrogen sulfide solutions and atmospheres, as well as oxidizing acids.

Bronze alloys exhibit enhanced resistance to seawater and pitting corrosion.

## Mechanical Properties

|      | Tensile Strength [MPa] | Yield Strength [MPa] | Elongation A50 [%] | Hardness HV [-] | Bend ratio 90° [r] |     | Bend ratio 180° [r] |    |
|------|------------------------|----------------------|--------------------|-----------------|--------------------|-----|---------------------|----|
|      |                        |                      |                    |                 | GW                 | BW  | GW                  | BW |
| R310 | 310-390                | ≤ 250                | ≥ 45               | 75-105          | 0                  | 0   | 0                   | 0  |
| R400 | 400-500                | ≥ 240                | ≥ 14               | 120-160         | 0                  | 0   | 0                   | 0  |
| R490 | 490-580                | ≥ 430                | ≥ 8                | 160-190         | 0                  | 0   | 1                   | 2  |
| R550 | 550-640                | ≥ 510                | ≥ 4                | 180-210         | 0                  | 1.5 | 2                   | 3  |
| R630 | 630-720                | ≥ 600                | ≥ 2                | 200-230         | 1.5                | 4   | 3                   | 5  |
| R690 | ≥ 690                  | ≥ 670                | -                  | ≥ 220           | 2.5                | 9   | -                   | -  |

Other tempers are available upon request.

$r = x * t$  (thickness  $t \leq 0.5\text{mm}$ )

GW bend axis transverse to rolling direction, BW bend axis parallel to rolling direction.

## Dimensional Specifications

| Thickness (mm) | Width (mm) |
|----------------|------------|
| 0.10-0.20      | 10-340     |
| 0.21-1.00      | 5-340      |
| 1.01-4.00      | 15-340     |
| 4.01-5.00      | 25-340     |