

Phosphor Bronze

Specifications:

Commercial: **PB102**
EN: **CW451K**

Bronzes are copper-based alloys with the major alloying element being Tin. They offer a combination of properties such as high strength, hardness, corrosion resistance and wear resistance.

Bronze alloy CW451K/PB102 is a Phosphor Bronze. Phosphor Bronzes are alloys of Copper and Tin. PB102 has good corrosion resistance and is known for its high fatigue strength. It also shows a good combination of strength and ductility.

Applications

CW451K/PB102 is typically used in the following:

- Gears
- Worm gears
- Bushes
- Marine applications
- Aircraft applications
- Chemical applications
- Springs

CW451K/PB102 is the most widely used of the wrought Phosphor Bronzes.

Alloy designations

CW451K/PB102 corresponds to the following designations but may not be a direct equivalent:
UNS C51000, ISO CuSn5.

Supplied forms

CW451K/PB102 is typically supplied in the following: round bar, square bar, flat bar, sheet and plate.

Corrosion resistance

Alloy CW451K/PB102 has good corrosion resistance equivalent to that displayed by the Aluminium Bronzes.

Cold working

Cold working response of CW451K/PB102 is excellent.

Hot working

Hot formability of CW451K/PB102 is considered poor.

Heat treatment

Solution treatment or annealing of CW451K/PB102 can be done by rapid cooling after heating to 500-700°C.

Machineability

The machineability rating of CW451K/PB102 is rated as poor at 20 compared to Brass CZ121/CW614N which is rated to 100.

Weldability

Soldering, brazing and butt welding of CW451K/PB102 are rated as excellent. Oxyacetylene welding, seam welding and coated metal arc welding are rated as fair. Spot welding and gas shielded arc welding are rated as good.

General physical properties	
Property	Value
Density	8.85g/cm ³
Melting point	930°C
Modulus of elasticity	121 GPa
Thermal conductivity	63 W/m.K
Electrical resistivity	0.096 x10 ⁻⁶ Ω.m

Mechanical properties	
EN1652:1998 sheet 0.1-5mm	
Property	Value
Proof stress	240-670 min MPa
Tensile strength	400-720 min MPa
Hardness Vickers	75-230 HV
Elongation A50mm	2-45% min

Chemical composition	
EN1652:1998 CW451K	
Element	% Present
Tin (Sn)	4.50-5.50
Phosphorus (P)	0.01-0.40
Nickel (Ni)	0.0-0.20
Zinc (Zn)	0.0-0.20
Others (Total)	0.0-0.20
Iron (Fe)	0.0-0.10
Lead (Pb)	0.0-0.02
Copper (Cu)	balance

Mechanical properties may vary widely according to condition (soft/half hard etc)

DISCLAIMER

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