

# Copper C101 / CW004A

It is believed that copper has been mined for over 5000 years. It can be found in elemental form and in the minerals cuprite, malachite, azurite, chalcopyrite and bornite. Copper is also often found as a by-product of silver production.

Next to silver, copper is the next best conductor of electricity. It is a yellowish red metal that can be polished to a bright metallic lustre. It is tough, ductile and malleable. Copper has a disagreeable taste and a peculiar smell.

Copper is resistant to corrosion in most atmospheres including marine and industrial environments. It is corroded by oxidising acids, halogens, sulphides and ammonia based solutions.

C101 / CW004A is the designation for the 99.9% pure copper used in a range of engineering applications.

C101 / CW004A is also known as HC or high conductivity copper. It has a nominal conductivity of 100% IACS (International Annealed Copper Standard). It also has high thermal conductivity. This is therefore the material of choice for use in conductors and electrical components but not when the service environment is a reducing atmosphere.

High ductility and impact strength also serve to make C101 / CW004A an extremely useful material.

C101 / CW004A is also the base material from which common brasses and bronzes are produced.

## Applications

C101 / CW004A is typically used in:

- ◆ General engineering
- ◆ Electronics
- ◆ Automotive
- ◆ Domestic Appliances
- ◆ Cold formed components

## Typical Chemical Composition

%	C101 / CW004A
Cu	99.9 min
Pb	-
Sn	-
Fe	-
Al	-
Mn	-
Zn	-
Si	-
Ni	-
P	-

## Typical Mechanical Properties

Grade	C101/CW004A
Tensile Strength (MPa)	200-360
Proof Stress 0.2% (MPa)	50-340
Elongation A5 (%)	42
Hardness VPN	40

## Typical Physical Properties


Property	Value
Density	8.91 g/cm <sup>3</sup>
Melting Point	1083 °C
Modulus of Elasticity	117 GPa
Electrical Resistivity	0.0171x10 <sup>-6</sup> Ω.m
Thermal Conductivity	391.1 W/m.K at 100°C
Thermal Expansion	16.9x10 <sup>-6</sup> /K at 100°C

## Alloy Designations

HC copper corresponds to the following designations:

CEN	BS	UNS	ISO
CW004A	C101	C11000	Cu-ETP



	<p><i>Amari is a registered trademark of Amari Metals Ltd</i></p> <p>© Copyright: Amari Metals Ltd, 25 High Street, Cobham, Surrey, KT11 3DH</p>
<p>All Data is indicative only and must not be seen as a substitute for the full specification from which it is drawn. In particular, the mechanical property requirements vary widely with temper, product form and product dimensions. For more complete details please refer to the relevant specification.</p>	

## Corrosion Resistance

Corrosion resistance is either good or excellent in most environments and atmospheres other than those containing ammonia ions.

## Cold Working

C101 / CW004A can be readily cold worked. When in the annealed condition, it can be readily bent to shape and has excellent ductility.

It work hardens relatively slowly and can be annealed in neutral or oxidising atmospheres.

## Hot Working

C101 / CW004A is very readily hot worked.

## Heat Treatment

Solution treatment or annealing can be done by rapid cooling after heating to 370-650°C.

## Machinability

C101 / CW004A has a machinability rating of 20 where Brass CZ121 / CW614N is 100.

## Welding

Soldering of C101 / CW004A is excellent. Brazability and butt welding are also rated as good. Gas shielded arc welding has a fair rating. All other welding processes are not recommended.

## Supplied Forms

C101 / CW004A is typically supplied in the following forms:

- ◆ Flat bar
- ◆ Round bar
- ◆ Half hard sheet

*This information is based on our present knowledge and is given in good faith. However, no liability will be accepted by the Company in respect of any action taken by any third party in reliance thereon. As the products detailed may be used for a wide variety of purposes and as the Company has no control over their use; the Company specifically excludes all conditions or warranties expressed or implied by statute or otherwise as to dimensions, properties and/or fitness for any particular purpose. Any advice given by the Company to any third party is given for that party's assistance only and without liability on the part of the Company. Any contract between the Company and a customer will be subject to the Company's Conditions of Sale. The extent of the Company's liabilities to any customer is clearly set out in those Conditions; a copy of which is available on request.*



**Amari is a registered trademark of Amari Metals Ltd**

© Copyright: Amari Metals Ltd, 25 High Street, Cobham, Surrey, KT11 3DH

All Data is indicative only and must not be seen as a substitute for the full specification from which it is drawn. In particular, the mechanical property requirements vary widely with temper, product form and product dimensions. For more complete details please refer to the relevant specification.