# Copper and Copper Alloys
# CW004A Sheet, Plate and Bar

DURBIN METAL INDUSTRIES

## SPECIFICATIONS

| | |
|---|---|
| Commercial | C101 |

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 has a yellowish/gold colour 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
~ Busbars
~ Automotive
~ Domestic Appliances
~ Cold formed components

## CHEMICAL COMPOSITION

*EN 1652:1997 /EN13601*
*CW004A*

| Element | % Present |
|---|---|
| Copper (Cu) | 99.9 min |
| Others (Total) | 0.1 max |

## ALLOY DESIGNATIONS

C101/CW004A HC Copper corresponds to the following designations **but may not be a direct equivalent:**
UNS C11000
ISO Cu-ETP

## SUPPLIED FORMS

C1101/CW004A HC Copper is typically supplied as flat bar, round bar and half hard sheet
- Bar
- Sheet
- Plate

## GENERIC PHYSICAL PROPERTIES

| Property | Value |
|---|---|
| Density | 8.92 g/cm³ |
| Melting Point | 1083 °C |
| Thermal Expansion | 16.9 x$10^{-6}$ /K |
| Modulus of Elasticity | 117 GPa |
| Thermal Conductivity | 391.1 W/m.K |
| Electrical Resistivity | 100 % IACS |
| Electrical Resistivity | 0.0171 x$10^{-6}$ Ω .m |

## MECHANICAL PROPERTIES

*EN 1652:1997*
*Sheet*
*0.2mm to 15mm Thick*

| Property | Value |
|---|---|
| Proof Stress | 50-340 MPa |
| Tensile Strength | 200-360 MPa |
| Elongation A50 mm | 50-5 % |
| Hardness Vickers | 40 to 110 HV |

*Mechanical properties vary widely according to condition (soft/half hard/etc)*
*Bar products supplied as 'D' have no specific mechanical properties.*

*EN 13601*
*Bar*
*2 to 80mm Dia./ A/f*

| Property | Value |
|---|---|

*Mechanical properties vary widely according to condition (soft/half hard/etc)*
*Bar products supplied as 'D' have no specific mechanical properties.*

## CORROSION RESISTANCE

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

[1 OF 2] CONTINUED

## 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.

## WELDABILITY

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.

## CONTACT

| | |
|---|---|
| Address: | Aldridge Warehouse<br>No. 1 Wharf Approach<br>Anchor Brook Industrial Park<br>Aldridge<br>Walsall<br>WS9 8BX |
| Tel: | +44 (0)19 2245 3982 |
| Email: | sales@durbinmetals.co.uk |
| Web: | www.durbinmetals.co.uk |

## REVISION HISTORY

| | |
|---|---|
| Datasheet Updated | 18 July 2019 |

## DISCLAIMER