

Electrolytic Tough Pitch Copper (ETP) C101 / CW004A is a commercially pure high conductivity grade of copper refined by electrolytic deposition which is then melted and oxidised to the "tough pitch" condition with a controlled low oxygen content. This is the most widely used of all the coppers because of its combination of electrical and thermal conductivity, corrosion resistance, workability and aesthetic beauty.

C101 / CW004A is the normal grade for general electrical use as busbar, motor and transformer components, windings and many other current carrying applications. It is also very popular with architects for applications where the corrosion resistance is required for building applications. Over time the C101 will also develop the weathered copper, green patina, appearance that offers additional corrosion resistance and a desirable look.

The use of this alloy in elevated temperature environments can be limited due to oxygen being present in the form of Cu_2O . This can cause the alloy to be susceptible to hydrogen embrittlement in reducing gasses or when welding or brazing using an oxy-fuel gas flame.

Chemical Composition

Copper 99.90 min Oxygen 0.005 – 0.040

Total Imps 0.03% max (excl. O_2 & Ag)

Related Specifications

- C11000 ETP
- BS1433
- BS13601 CW004A
- Cu-ETP
- DIN 2.0060

Key Features

- Very High Electrical Conductivity
- Excellent formability
- Very Good Thermal Conductivity
- Excellent Joining Characteristics

Typical Physical Properties

Melting Point 1083°C Density 8.92 g/cm³ 385 J/Kg °K Specific heat 393 W/m°K Thermal conductivity Thermal expansion coefficient (20-200°C) 17.3 x 10⁻⁶ Per °C 100 % IACS Electrical conductivity $0.0172 \times 10^{-6} \text{ microhm /m}$ Electrical Resistivity 118000 N/mm² Modulus of elasticity

Fabrication Properties

Hot Working Temperature Range 750-950°C
Hot Formability Good
Cold Formability Excellent
Cold reduction between anneals 90% max.
Machinability rating (free cutting brass = 100) 20%
Appealing Tomp. Pange 200-650°C

Annealing Temp. Range 200-650°C Stress Relieving Temp. Range 150-200°C

Joining Methods

Soldering Excellent Brazing Good

Oxy-acetylene welding Less Suitable

Gas-shielded arc welding Fair

butt Good

Typical Uses:

The C101 / CW004A is mostly utilised for general electrical busbar, motor and transformer components, windings, electrical conductors, contacts, terminals and many other current carrying applications. Other uses include architectural metalwork, gutters, flashing, roofing, automotive and industrial radiators, together with chemical process equipment, vats, kettles and pans.

This technical information is given by Holme Dodsworth Metals without charge and the user shall employ such information at his own discretion and risk. For more detailed technical advice on temper selection, fabrication, joining, machining, physical and mechanical data please contact us as space does not permit the listing of every feature of the material.