

Copper

C101 • C103 • C106 • C107 • C109 • C110

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Copper is used for a variety of applications from electrical parts to electronics to plumbing fittings for the construction industry. Each grade stocked by Columbia Metals offers its own specific advantages.

C101 / Cu-ETP (Electrolytic Tough Pitch copper)

C101 (Cu-ETP) is a commercially pure high conductivity grade of copper. It has a nominal conductivity of 100% IACS (International Annealed Copper Standard) and a high thermal conductivity, making it the material of choice for use in conductors and electrical components. C101 is refined by electrolytic deposition and then melted and oxidised to the "tough pitch" condition with a controlled low oxygen content.



C101: high conductivity earthing rods

C103 / Cu-OF (oxygen-free copper)

C103 (Cu-OF) is a commercially pure grade of oxygen-free copper manufactured by pouring in a protective gas atmosphere or vacuum. The absence of oxygen ensures high levels of electrical conductivity and low susceptibility to embrittlement when heated in a reducing atmosphere.

C106 / Cu-DHP (phosphorous deoxidised copper)

C106 (Cu-DHP) is a grade of copper from which oxygen is removed by the controlled addition of phosphorous during the melting cycle. It is the material normally used for the manufacture of copper tubes as it can be readily welded and brazed. C106 has deep drawing characteristics superior even to those of tough pitch (C101) copper.



C106: readily welded and brazed for tubes

C107 / Cu-DPA (arsenical copper)

C107 (Cu-DPA) is a copper alloy with a small addition of arsenic which enhances tensile strength properties at elevated operating temperatures up to 300°C. As well as increasing the softening resistance, the arsenic also enhances corrosion resistance in specific environments. This grade is deoxidised, which gives it freedom from hydrogen embrittlement, making it ideal for applications requiring welding and brazing. C107 has excellent fabrication characteristics and is typically specified for boiler plates and stay bolts in steam locomotive fireboxes.



C107: commonly used for stay bolts

C109 (tellurium copper)

C109 is a free-machining grade of copper with an addition of around 0.5% tellurium. The tellurium content raises the machinability rating to 90% with minimal effect on conductivity and ductility. C109 has freedom from hydrogen embrittlement, enabling the use of this grade in electrical and electronic applications where accuracy and intricacy are required.

C110 / Cu-OFE (oxygen-free copper)

C110 is the purest grade of oxygen-free copper, with a 99.99% copper content. With much tighter limits on impurities than other grades, C110 offers the highest electrical and thermal conductivity values available from a commercially available copper alloy and is not susceptible to embrittlement when hardened. Specified for electronic applications requiring freedom from harmful impurities and oxide which can impair and contaminate electronic devices, C110 also has high ductility and is readily cold worked.

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Copper

Grades and Properties



Designation and Related Specifications	Available Forms	Size Range	Applications
C101 Cu-ETP, C11000, CW004A		3/16" – 3" dia 1/2" – 1" sq 3/4" – 4" flat	<p>Power generation: cables, overhead line conductors, generator windings, busbars, coaxial lines</p> <p>Other: cables, overhead line conductors; motor, generator, transformer and instrument windings including enamelled wire, busbars, contacts, household and industrial wiring; switches, terminals, earthing rods, commutator segments, coaxial lines, anodes for electroplating</p>
C103 Cu-OF, C10200, CW008A		5/8" – 4.3/4" dia 1/4" thk sheet	<p>General: radar and other electronic equipment, anodes for vacuum tubes, glass to metal seals in electronic equipment, thermostatic control valves, rotor conductors for large generators and motors, electrical equipment for service at elevated temperatures in the presence of reducing gases, anodes for electroplating, particularly in cyanide baths</p>
C106 Cu-DHP, C12200, CW024A		1" dia 12g – 24g 3/16" – 3.1/2" od	<p>Chemical processing: heat exchanger plant, calorifiers, chemical plant, storage tanks, refrigeration plant, chemical pipework, water and gas installations and tubing, soil and waste disposal</p> <p>Other: roofing sheet, architectural and decorative metalwork, air conditioning equipment and pipework, central heating systems, marine and general engineering fasteners, masonry fittings</p>
C107 Cu-DPA, C14200		7/8" – 2" dia Plate also available	<p>Rail: steam locomotive stay bolts, rivets and boiler plates</p> <p>Chemical processing: chemical plant and equipment for relatively non-corrosive liquids and gases at moderately elevated temperatures</p>
C109 C14500, CW118C		3/16" – 1.3/8" dia	<p>General: transformer and circuit breaker terminals, contacts, connectors, clamps, bolts, nuts, studs and other high current-carrying components requiring free machinability</p>
C110 Cu-OFE, C10100, CW009A		1/4" – 6" dia	<p>General: components for vacuum devices, switches, interrupters, deposition units; components for superconductive magnets; electron tubes including anodes, fins and collectors; glass to metal seals, wave guide tubes, linear accelerators</p>