HOLME DODSWORTH METALS LIMITED
www.holmedodsworth.com

C109 / CW118C is a free machining tellurium containing alloy that retains the high conductivity values associated with pure copper. The machining characteristics of the copper are significantly improved by alloying it with approximately half per cent of tellurium, while the electrical and thermal conductivity are only slightly reduced.

The tellurium forms a small precipitate that is evenly distributed throughout the microstructure and acts as a chip breaker causing the swarf to break into short pieces. The alloy offers a machinability rating of ~90% (free cutting brass = 100) versus a standard copper machinability rating of ~20%. This allows the C109 / CW118C to be machined at a much higher speed with lower tool wear, giving machinists and designers a more cost effective product.

Tellurium copper is manufactured by refining, melting and casting the material in to billets for the manufacture of the final product. It is essential that any oxygen is eliminated at this stage to give a resistance to hydrogen embrittlement and prevent any oxygen combining with tellurium that would make the copper brittle.

Chemical Composition

Copper	Rem
Tellurium	0.4–0.7%
Phosphorus	0.003-0.012%
Total Imps	0.1% max

Related Specifications

- BS2874 C109 CuTe
- BS12164 CW118C
- CuTe
- C14500
- DIN 2.1546

Key Features

- Excellent Electrical Conductivity
- Free Machinability
- Freedom from Hydrogen Embrittlement
- Very Good thermal conductivity

Typical Physical Properties

Melting Point	1081°C
Density	8.9 g/cm³
Specific heat	385 J/Kg °K
Thermal conductivity	370 W/m°C
Thermal expansion coefficient (20-200°C)	17.0 x 10^{-6}
Electrical conductivity	94 % IACS
Electrical resistivity	0.0187 microhm m
Modulus of elasticity	12500 Kg/mm²

Fabrication Properties

Hot Working Temperature Range	725-825°C
Hot Formability	Good
Cold Formability	Good
Cold reduction between anneals	70% max.
Machinability rating (free cutting brass = 100)	85-90%

Joining Methods

Soldering		Excellent
Brazing		Good
Oxy-acetylene welding		Not Recommended
Gas-shielded arc welding		Fair
Resistance welding:	Spot and Seam	Not recommended
	Butt	Fair

Typical Uses:

Traditional uses for C109 / CW118C Tellurium Copper are electrical components that require extensive or intricate machining including electrical switches for power semi-conductors, transformer and circuit breaker terminals, gas cutting nozzles, contacts, clamps, electrical connector pins, bolts, nuts, studs and other components requiring free machinability.

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.