

## Data Sheet

### TELLURIUM COPPER - C109/CW118C

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 offer a machinability rating of ~90% (free cutting

brass=100) versus a standard copper machinability rating over ~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 into 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.

#### Key Features:

- Excellent electrical conductivity
- Free Machinability
- Freedom for Hydrogen Embrittlement
- Very Good thermal conductivity

#### Related Specifications:

C109	C14500
CW118C	CuTe
DIN 2.1546	

#### Chemical Composition:

Copper	Rem
Tellurium	0.4 - 0.7%
Phosphorus	0.003 - 0.012%
Total Imps	0.01% max

#### 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.

#### Typical Physical Properties:

Melting point	1081°C
Density	8.94 g/cm <sup>3</sup>
Specific heat	385 J/Kg °K
Thermal conductivity	370 W/m°C
Thermal expansion coefficient (20 - 200°C)	17.0 x 10 <sup>-6</sup> per °C
Electrical conductivity	94% IACS
Electrical resistivity	0.0187 microhm/m
Modulus of elasticity	12 500 N/mm <sup>2</sup>

#### Fabrication Properties:

Hot working temperature range	728 - 825°C
Hot formability	Good
Cold formability	Good
Cold reduction between anneals	70% max
Stress relieving temp. Range	150 - 200°C

#### Joining Methods

Soldering	Excellent
Brazing	Good
Oxy-acetylene welding	Not recommended
Gas-shielded arc welding	Fair
Resistance welding: Spot and seam butt	Not recommended - Fair