HOLME DODSWORTH METALS LIMITED
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C111 / CW114C is a free machining sulphur copper with a machinability rating of approximately 80% (free machining brass = 100%). The addition of sulphur to the copper creates Cu2S copper sulphide within the microstructure that acts as a chip breaker and forms the basis of the free machining capacity.

The free cutting properties of sulphur copper combined with its high retention of electrical and thermal conductivity values (usually only associated with purer coppers) enables its use in a wide variety of applications. The C111 / CW114C can also be machined at much higher speeds with lower tool wear, giving machinists and designers a more cost effective product.

Sulphur copper is de-oxidised during its manufacture by adding phosphorus, and as a result the material offers a freedom from hydrogen embrittlement. Other benefits of C111 / CW114C are high corrosion resistance, a very good formability and can be joined easily by soldering.

**Chemical Composition**

| | |
|---|---|
| Copper | Rem |
| Sulphur | 0.2–0.7% |
| Phosphorus | 0.003-0.012% |
| Total Imps | 0.1% max |

**Related Specifications**

- BS2874 C111
- C14700
- BS EN12164 CW114C
- CuSP

**Key Features**

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

**Typical Physical Properties**

| | |
|---|---|
| Melting Point | 1079°C |
| Density | 8.94 g/cm³ |
| Specific heat | 385 J/Kg °K |
| Thermal conductivity | 347 W/m |
| Thermal expansion coefficient (20-200°C) | 17 x $10^{-6}$ per °C |
| Electrical conductivity | 93% IACS |
| Electrical resistivity | 0.0181 microhm m |
| Modulus of elasticity | 12500 Kg/mm² |

**Fabrication Properties**

| | |
|---|---|
| Hot Working Temperature Range | 750-870°C |
| Hot Formability | Good |
| Cold Formability | Good |
| Cold reduction between anneals | 70% max. |
| Machinability rating (free cutting brass = 100) | 80% |

**Joining Methods**

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

**Typical Uses:**

Traditional uses for C111 / CW114C sulphur copper are electrical components that require high conductivity values combined with free machining properties including; transformer and circuit breaker terminals, electrical contacts and connectors, clamps, cable glands and fasteners.