

Cu-ETP

20 03

Comparable standards: UNS C11000 • EN CW004A • JIS C110

Aurubis designations: C110 • PNA 211 • ETP • SM 0008

Description

Cu-ETP is an electrolytically refined, oxygen-containing copper. It has a very good electrical conductivity and is economically interesting, compared to other high-conductivity copper alloys. Due to the residual oxygen content the alloy it is not suited for welding because it is susceptible to hydrogen embrittlement.

Fields of application are architectural and components of electrical engineering.

Composition

| Cu | O | Bi | Pb |
|-----------|----------|------------|-----------|
| [%] | [%] | [%] | [%] |
| min 99.90 | max 0.04 | max 0.0005 | max 0.005 |

Composition of this alloy is in accordance with RoHS for electric & electronic components and ELV for the automotive industry.

Physical properties

| Melting point | Density | c _p @ 20°C | Young's modulus | Thermal cond. | Electrical cond. | | α @20-300°C |
|---------------|----------------------|--------------------------|-----------------|---------------|------------------|---------|-----------------------|
| | | | | | [MS/m] | [%IACS] | |
| [°C] | [g/cm ³] | [kJ/kgK] | [GPa] | [W/mK] | | | [10 ⁻⁶ /K] |
| 1083 | 8.9 | 0.394 | 127 | 390 | ≥ 58 | ≥100 | 17.7 |

Note: The specified conductivity applies to the soft condition only.

c_p specific heat capacity

α coefficient of thermal expansion

Mechanical properties

| | Tensile Strength | Yield Strength | Elongation A ₅₀ | Hardness HV | Bend ratio 90° [r] | |
|------|------------------|----------------|----------------------------|-------------|--------------------|-----|
| | [MPa] | [MPa] | [%] | [-] | GW | BW |
| R220 | 220-260 | ≤ 140 | ≥ 33 | 40-65 | 0 | 0 |
| R240 | 240-300 | ≥ 180 | ≥ 8 | 65-95 | 0 | 0 |
| R290 | 290-360 | ≥ 250 | ≥ 4 | 90-110 | 0 | 0.5 |
| R360 | ≥ 360 | ≥ 320 | ≥ 2 | ≥ 110 | 1 | 2 |

r = x * t (thickness t ≤ 0.5mm)

GW bend axis transverse to rolling direction. BW bend axis parallel to rolling direction.

Fabrication properties

| | |
|--------------------------|-----------------|
| Cold formability | excellent |
| Hot formability | excellent |
| Soldering | excellent |
| Brazing | good |
| Oxyacetylene welding | not recommended |
| Gas shielded arc welding | fair |
| Resistance welding | not recommended |
| Machinability | not recommended |

Electrical conductivity

The electrical conductivity depends on chemical composition, the level of cold deformation and the grain size. A high level of deformation as well as a small grain size decrease the conductivity.

**Corrosion
Resistance**

Copper is resistant to: Natural and industrial atmospheres as well as maritime air, drinking and service water, non oxidizing acids, alkaline solutions and neutral saline solutions.
Copper is not resistant to: Ammonia, halogenide, cyanide and hydrogen sulfide solutions and atmospheres, oxidizing acids and sea water (especially at high flow rates).
Due to the oxygen content Cu-ETP is not resistant to hydrogen embrittlement in reducing atmospheres at elevated temperatures.

Typical uses

Architectural metal-work, gutters, flashing, roofing, downspouts, perforated metal screens, automotive and industrial radiators, electrical conductors, contacts, terminals, chemical process equipment, kitchen needs, electric percolator bodies, lamps, dishes and planters for home and office

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