



# EMH-Copper Tubes in Cu-ETP

**Cu-ETP** is a copper with a low oxygen content. It has good electrical and thermal conductivity. Due to the oxygen content its use at higher temperatures in a reducing atmosphere is critical, especially if a hydrogenous atmosphere (hydrogen embrittlement) is concerned. This means that there are certain limitations with regard to annealing and also welding and soldering.

## Chemical Composition \*

Cu ≥ 99.9 %

with oxygen and non-deoxidized  
(O max. 0.04 % or O max. 0.06 % if agreed)

\* Standard values in % by weight

## Material Description

EN	Cu-ETP, CW004A
UNS	C11000
DIN*	E-Cu57, 2.0060
BS*	C101
NF*	Cu-a1

\* former national standards

## Physical Properties \*

### Electrical conductivity

MS/m ≥ 58

% IACS ≥ 98

### Thermal conductivity

W/(m\*K) > 385

### Thermal expansion coefficient

(0 – 300 °C) 10<sup>-6</sup>/K 17.7

### Density

g/cm<sup>3</sup> 8.93

### Modulus of elasticity

GPa 127

\* Standard values at room temperature

1 GPa = 1 kN/mm<sup>2</sup>

1 MS/m = 1 m/Ω · mm

## Processing Properties

### Forming

Machinability  
(CuZn39Pb3 = 100%) 20 %

Cold forming excellent

Hot forming fair

### Joining

Resistance welding good

Inert gas shielded arc welding fair

Hard soldering good

Soft soldering excellent

### Surface Treatment

#### Polishing

mechanical good

electrolytical excellent

Electroplating excellent

## Heat Treatment

Melting point 1,083 °C Liquidus

Hot forming 750 – 900 °C

Soft annealing 250 – 500 °C, 1-3 h

Thermal stress-relieving 150 – 200 °C, 1-3 h

## Corrosion Resistance

Pure copper and high copper alloys generally show good corrosion resistance due to their precious character and are practically impervious to stress corrosion cracking.

## Mechanical Properties (attainable values, depending on the dimension and form)

Standard values	from (soft)	to (hard)
R <sub>m</sub> [MPa]	230	390
R <sub>p0.2</sub> [MPa]	70	350
A <sub>5</sub> [%]	50	3
HB	50	110

