Cu ETP

Cu-ETP – Electrolytic Tough Pitch Copper – is an electrolytic refined copper widely used for electrical and electronic applications.

Cu-ETP has the properties required in all applications with a hydrogen-free atmosphere.

In the presence of H_2 and heat all oxygen-bearing coppers suffer from so-called hydrogen embrittlement. This is a chemical reduction of copper oxide by diffusing hydrogen leading to formation of H_2O within the microstructure, resulting in embrittlement of the grain boundaries.

The phosphorus of our copper content is very low, so that electrical conductivity is comparable to the best performing materials.

CHEMICAL COMPOSITION

Aurubis Typical Analysis *																		
Element	Ag	As	Bi	Cd	Co	Cr	Fe	Mn	Ni	O_2	P	Pb	S	Sb	Se	Sn	Te	Zn
[ppm]	10	<1	<0.5	<0.1	<1	<1	<2	<1	<1	<3	<1	<1	<5	<1	<0.5	<1	<0.5	<1

* In accordance to EN standard

		Cu	Ag	As	Bi	Cd	Co	Cr	Fe	Mn	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Other
		[%]	[ppm]																			
EN 13601 Cu ETP	CW004A	≥99.901)	-	-	≤ 5	-	-	-	-	-	-	≤ 400	-	≤ 50	-	-	-	-	-	-	-	≤ 300

[1] *Silver included up to a maximum of 0.015%*

Correspondence to other standards

	DIN	NF	BS	ASTM	JIS
Cu-ETP	E-Cu57 / E-Cu58	Cu-a1	C101	C11000	C1100
CW004A	2.0060 / 2.0065				

PHYSICAL PROPERTIES

Density		Electrical conductivity [2]		Thermal conductivity	Expansion [4]	Specific heat	Elastic modulus
[g/cm³]		[MS/m]	[%IACS] [3]	[W/m·K]	[ppm/K]	[J/kg K]	[GPa]
Conditions	20°C	20°C / annealed	20°C / annealed	20°C	20 to 100°C	20°C	20°C annealed
8.94		>58	>101	393	16.8	386	110

[2] *Resistivity ρ is the inverse value of conductivity, e.g. ρ = 1/58.6 =0.01724 m/MS or Ω·mm²/m.*
[3] *International Annealed Copper Standard: 100% IACS = 0.01724 μ Ω x m at 20°C*
[4] *Linear coefficient of thermal expansion (CTE), as a mean value between the given temperatures.*

Cu ETP

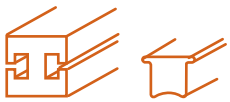
MECHANICAL PROPERTIES

Flat, round, square, hexagonal according to EN13601

Metallurgical State D	Dimensions mm									Hardness				Ultimate Tensile Strength	Yield Strength	Elongation	
	Round, square, hexagonal			Rectangular						HB		HV		Rm [MPa]	Rp0,2 [MPa]	A100 mm [%]	A [%]
	Thickness			Width													
	From	up to	To	From	up to	To	From	up to	To	Min	Max	Min	Max	Min		Min	Min
D	2	-	80	0.5	-	40	1	-	200	Cold drawn product without any specific mechanical properties							
H035 [a]	2	-	80	0.5	-	40	1	-	200	35	65	35	65	-	-	-	-
R200 [a]	2		80	1		40	5		200					200	max.120	25	35
H065	2	-	80	0.5	-	40	1	-	200	65	90	70	95	-	-	-	-
R250	2		10	1	-	10	5	-	200	-	-	-	-	250	min.200	8	12
R250	2	10	30	-	-	-	-	-	-	-	-	-	-	250	min.180	-	15
R230	-	30	80	-	10	40	-	10	200	-	-	-	-	230	min.160	-	18
H085	2	-	40	0.5	-	20	1	-	120	85	110	90	115	-	-	-	-
H075	-	40	80	-	20	40	-	20	160	75	100	80	105	-	-	-	-
R300	2	-	20	1	-	10	5	-	120	-	-	-	-	300	min.260	5	8
R280	-	20	40	-	10	20	-	10	120	-	-	-	-	280	min.240	-	10
R260	-	40	80	-	20	40	-	20	160	-	-	-	-	260	min.220	-	12
H100	2	-	10	0.5	-	5	1	-	120	100	-	110	-	-	-	-	-
R350	2	-	10	1	-	5	5	-	120	-	-	-	-	350	min.320	3	5

[a] *Annealed*

Profiles according to EN13605



Metallurgical State	Dimensions mm		Hardness				Ultimate Tensile Strength	Yield Strength	Elongation	
	Thickness	Width	HB		HV		Rm [MPa]	Rp0,2 [MPa]	A100 mm [%]	A [%]
	Max.	Max.	Min	Max	Min	Max	Min		Min	Min
D	50	180	Same as drawn							
H035 [b]	50	180	35	65	35	70	-	-	-	-
R200 [b]	50	180	-	-	-	-	200	Max.120	25	35
H065	10	150	65	95	70	100	-	-	-	-
R240	10	150	-	-	-	-	240	Min.160	-	15
H080	5	100	80	115	85	120	-	-	-	-
R280	5	100	-	-	-	-	280	Min.240	-	8

[b] *Annealed*