Datasheet:

EN Cu-ETP / CW004A
99,9% Pure Copper
Rod, bar and wire for general electrical purposes

Alumeco ApS
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Internal alloy name:	**CW004A**
Metal:	**Copper**
Chemical Symbol:	**Cu-ETP**
EN:	**EN Cu-ETP**
UNS:	**C11000**
SS:	**5010**
GB:	**TU00 / C10100**
JIS:	**C1100**
Also known as:	**-**
Alloy type:	**Electrical conducting**

Main usage:

- Automotive
- Cables and wires
- Clamps, connectors and fasteners
- Electrical installations
- Electronic products
- Lightning rods and grounding

Main properties:

- High thermal and electrical conductivity
- Excellent forming properties

Important norms and literature:

General Standards
EN 13601:2013: Copper and copper alloys – Copper rod, bar and wire for general electrical purposes

Geometric Tolerance:
EN 13601:2013: Copper and copper alloys – Copper rod, bar and wire for general electrical purposes

Chemical composition in %: EN 13601:2013

Cu	Bi	Pb	O	Other elements	
				Each	Together
99,90	Max. 0,0005	Max. 0,005	Max. 0,040	-	0,03

Mechanical properties: EN 13601:2013

Material Condition	Round, Square & Hexagonal	Rectangular mm		Tensile strength R_m	0,2% proof strength $R_{p0,2}$	Elongation Min. %		Hardness HBW
	mm	Thickness	Width	MPa Min.	MPa	A_{100mm}	A	
D	2 – 160	0,5 – 40	1 – 200	COLD WORKED WITHOUT SPECIFIED PROPETIES				
R200	2 – 160	1 – 40	1 – 200	200	Max.120	25	35	-
H065	2 – 80	0,5 – 40	1 – 200	-	-	-	-	65 – 90
R230	30 – 80	10 – 40	10 – 200	230	Min. 160	-	18	-
R250	2 – 10	1 – 10	5 – 200	250	Min. 200	8	12	-
	10 – 140	10 – 40	10 - 200	250	Min. 180	-	15	-
H085	2 – 40	0,5 – 20	1 – 120	-	-	-	-	85 – 110
R280	20 – 60	20 – 40	20 – 160	280	Min. 240	-	10	-

*** Information values only;**

Physical properties:

Density (20 °C) g/cm³	Solidification range °C	Material condition	Electrical conductivity % IACS Min.	Volume resistivity $\frac{\Omega \times mm^2}{m}$ Max.	Mass resistivity $\frac{\Omega \times g}{m^2}$ Max.	Thermal conductivity (20 °C) W/m K	E – modulus (20 °C) N / mm²
8,93	1083	D	96,6	0,01786	0,1588	394	110.000
		R200, R230, H065, R250	100	0,01724	0,1533		
		H085, R280	98,3	0,01754	0,1559		

Properties and information's (3 Excellent; 2 Good; 1 Poor/not recommendable)[1]

Machinability (Zerspanbarkeitsindex): 20*
*(CuZn39Pb3 = 100)

Forming Methods:

Hot Formability:	2
Cold Formability:	3

Corrosion resistance:

Atmosphere:	2
Waters and alkaline:	2
Acids, Ammonia, Seawater:	1

Joining Methods:

Soldering:	3
Brazing:	2
Oxy-acetylene welding:	1
Gas-shielded arc welding:	1
TIG welding:	1
MIG welding:	1
Spot/seam welding	1
Butt welding	2
Gluing/adhesion:	2

Surface Treatment:

Polishing:	
Mechanical:	2
Electrolytic/chemical:	3
Galvanizing:	3
Hot Dipping:	3

[1] **Information extracted from Kupferverband;**

Tolerances for Rods, Bars and Wires of CW004A

Dimensions: EN 13601:2013*

Dimensional tolerances for round, square and hexagonal rod and wire

Dimensions in millimetres

Nominal sizes	Tolerances	
	Round rod and wire (diameter) Class A	Square and hexagonal rod and wire (width across-flats) Class A
2 ≤ *D/W* ≤ 3	0 - 0,06	-
3 < *D/W* ≤ 6	0 - 0,08	0 - 0,12
6 < *D/W* ≤ 10	0 - 0,09	0 - 0,15
10 < *D/W* ≤ 18	0 - 0,11	0 - 0,18
18 < *D/W* ≤ 30	0 - 0,13	0 - 0,21
30 < *D/W* ≤ 50	0 - 0,16	0 - 0,25
50 < *D/W* ≤ 80	0 - 0,19	0 - 0,30
80 < *D/W* ≤ 120	0 - 0,35	0 - 0,54
120 < *D/W* ≤ 160	0 - 0,60	0 - 0,63

* Values are referred from Table 5 of EN 13601:2013

Dimensions: EN 13601:2013*

Tolerances on width and thickness of bar and rectangular wire

Dimensions in millimetres

Nominal width	Tolerance on width	Tolerance on nominal thickness for range of thickness					
		0,5 ≤ *t* ≤ 3	3 < *t* ≤ 6	6 < *t* ≤ 10	10 < *t* ≤ 18	18 < *t* ≤ 30	30 < *t* ≤ 40
1 ≤ *W* ≤ 10	± 0,08	± 0,05	± 0,06	± 0,08	-	-	-
10 < *W* ≤ 18	± 0,10	± 0,05	± 0,06	± 0,08	± 0,10	-	-
18 < *W* ≤ 30	± 0,15	± 0,05	± 0,07	± 0,09	± 0,10	± 0,15	-
30 < *W* ≤ 50	± 0,20	± 0,06	± 0,09	± 0,10	± 0,12	± 0,15	± 0,20
50 < *W* ≤ 80	± 0,25	± 0,09	± 0,10	± 0,12	± 0,15	± 0,18	± 0,25
80 < *W* ≤ 120	± 0,30	-	± 0,12	± 0,15	± 0,18	± 0,23	± 0,30
120 < *W* ≤ 160	± 0,40	-	-	± 0,18	± 0,20	± 0,25	± 0,35
160 < *W* ≤ 200	± 0,50	-	-	± 0,20	± 0,25	± 0,30	± 0,40

* Values are referred from Table 6 of EN 13601:2013

Dimensions: EN 13601:2013*

Radii for rounded corners of rod, bar and wire

Dimensions in millimetres

Nominal thickness *t* or width *W* across-flats	Corner radius	Tolerance on corner radius
0,5 ≤ *t/W* ≤ 1	0,5 * *t/W*	-
1 < *t/W* ≤ 3	0,5	-
3 < *t/W* ≤ 6	0,8	± 0,2
6 < *t/W* ≤ 10	1,0	± 0,3
10 < *t/W* ≤ 30	1,6	± 0,4
30 < *t/W* ≤ 80	2,5	± 0,5
80 < *t/W* ≤ 120	4,0	± 1,0
120 < *t/W* ≤ 160	6,0	± 1,0

* Values are referred from Table 8 of EN 13601:2013

Dimensions: EN 13601:2013*

Tolerance on fixed lengths (FL)

Ordered length	Tolerance
L ≤ 3000	+5 0
3000 < *L* ≤ 6000	+10 0
6000 < *L* ≤ 10000	+15 0

* Values are referred from Table 9 of EN 13601:2013

Dimensions: EN 13601:2013*

Maximum twist of square or hexagonal rod or rectangular bar

Nominal width *W* mm	**Maximum permitted twist *v*** mm	
	In any 1 m length	In total length *L* (in m)
10 ≤ *W* ≤ 18	1,0	1,0 × *L*
18 < *W* ≤ 30	1,5	1,5 × *L*
30 < *W* ≤ 50	2,0	2,0 × *L*
50 < *W* ≤ 80	3,0	3,0 × *L*
80 < *W* ≤ 120	4,5	4,5 × *L*
120 < *W* ≤ 200	6,0	6,0 × *L*

* Values are referred from Table 10 of EN 13601:2013

Dimensions: EN 13601:2013*

Straightness of rod and bar

Nominal diameter, width across-flats, thickness or width	**Maximum deviation from straightness** (See Figure 5 in EN 13601:2013)		
	h_2 in any length l_2 of 400 mm	h_1 for total length l_1	
		1 m ≤ *l* ≤ 4 m	> 4 m
10 mm ≤	0,8 mm	2,00 mm × l_1	by agreement

* Values are referred from Table 11 of EN 13601:2013

Dimensions: EN 13601:2013*

Flatness of bar

Values in millimetres

Nominal width *W* mm	**Maximum deviation from flatness *e* for nominal thickness** mm	
	1 ≤ *t* ≤ 6	6 < *t* ≤ 40
10 ≤ *W* ≤ 30	0,2	0,15
30 < *W* ≤ 50	0,3	0,2
50 < *W* ≤ 80	0,4	0,25
80 < *W* ≤ 120	0,5	0,3
120 < *W* ≤ 200	-	0,5

Where the ratio nominal width: nominal thickness is greater than 15:1, the deviation from flatness shall be agreed between the purchaser and the supplier.

* Values are referred from Table 12 of EN 13601:2013

Dimensions: EN 13601:2013*

Sampling rate

Nominal diameter or width across-flats *w* mm	**Mass of inspection lot for one test sample** kg
0,1 < *d*/*W* ≤ 0,8	≤ 100
0,8 < *d*/*W* ≤ 3,0	≤ 250
3,0 < *d*/*W* ≤ 10,0	≤ 500
10,0 < *d*/*W* ≤ 25,0	≤ 1000
25,0 < *d*/*W* ≤ 50,0	≤ 1500
50,0 < *d*/*W*	≤ 2000

For wire with polygonal or rectangular cross-section, the diameter of a round wire of equivalent cross-sectional area.

* Values are referred from Table 13 of EN 13601:2013