Datasheet:

EN Cu-HCP / CW021A 99,95% Pure Copper Tubes

Alumeco ApS
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Internal alloy name:	**CW021A**
Metal:	**Copper**
Chemical Symbol:	**Cu-HCP**
EN:	**EN Cu-HCP**
UNS:	**C10300**
SS:	**-**
GB:	**TU0.003 / C10300**
JIS:	**-**
Also known as:	**-**
Alloy type:	**Electrical conducting**

Main usage:

- Electrical conductors
- Industrial applications – e.g. boilers, pressure tanks, piping etc.
- Components for impact extrusion

Main properties:

- High thermal and electrical conductivity
- Good atmospheric corrosion resistance
- Good welding and soldering properties as well as resistance to hydrogen

Important norms and literature:

General Standards
EN 12449:2023: Copper and copper alloys – Seamless, round tubes for general purposes

Geometric Tolerance:
EN 12449:2023: Copper and copper alloys – Seamless, round tubes for general purposes

Chemical composition in %: EN 12449:2023

Cu	Bi	P	Pb	Other elements	
				Each	Together
Min. 99,95	Max. 0,0005	0,002 – 0,007	Max. 0,005	-	0,03

Mechanical properties: EN 12449:2023

Material Condition	Wall Thickness *t*	Tensile Strength R_m	0,2% proof strength $R_{p0,2}$	Elongation *A*	Hardness	
	Max. mm	Min. MPA	MPa	Min. %	HV	HBW
M	20	-	-	-	-	-
H040	20	-	-	-	40 – 65	35 – 60
R200	20	200	Max. 110	40	-	-
H070	10	-	-	-	70 – 100	65 – 95
R250	10	250	Min. 150	30/20/15	-	-
H095	5	-	-	-	95 – 120	90 – 115
R290	5	290	Min. 250	3	-	-
H110	3	-	-	-	Min. 110	Min. 105
R360	3	360	Min. 320	-	-	-

*** Information values only;**

Physical properties:

Density (20 °C)	Solidification range	Electrical conductivity	Thermal conductivity (20 °C)	Thermal expansion (20 - 300 °C)	Annealing temperature	E – modulus (20 °C)
g/cm³	°C	%IACS	W/m K	µm m^{-1} K^{-1}	ºC	N / mm²
8,94	1083	98 – 100	385	17	-	115.000

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 Tubes of CW021A

Dimensions: EN 12449:1999*
Tolerances on diameter

Nominal diameter *d* (mm)	Tolerances on nominal diameter (mm)	
	Applicable to mean diameter	Applicable to any diameter including deviation from circular form for straight lengths
3 ≤ d ≤ 10	± 0,06	± 0,12
10 < d ≤ 20	± 0,08	± 0,16
20 ≤ d ≤ 30	± 0,12	± 0,24
30 ≤ d ≤ 50	± 0,15	± 0,30
50 ≤ d ≤ 100	± 0,20	± 0,50
100 ≤ d ≤ 200	± 0,50	± 1,00
200 ≤ d ≤ 300	± 0,75	± 1,50
300 ≤ d ≤ 450	± 1,00	± 2,00

* Values are referred from Table 16 of EN 12449:1999

Dimensions: EN 12449:1999*
Tolerances on wall thickness

Nominal outside diameter D (mm)	Tolerances on nominal wall thickness *t* (mm) %				
	0,3 ≤ *t* ≤ 1	1 < *t* ≤ 3	3 < *t* ≤ 6	6 < *t* ≤ 10	10 < *t*
3 ≤ D ≤ 40	± 15	± 13	± 11	± 10	-
40 < D ≤ 120	± 15	± 13	± 12	± 11	± 10
120 ≤ D ≤ 250	-	± 13	± 13	± 12	± 11
250 ≤ D ≤ 450	-	-	± 15	± 15	± 15

* Values are referred from Table 17 of EN 12449:1999

Dimensions: EN 12449:1999*
Tolerances on fixed lengths, tubes in straight lengths

Nominal outside diameter D (mm)	Tolerance on fixed length *l* (mm)			
	l ≤ 250	250 < *l* ≤ 1000	1000 < *l* ≤ 4000	4000 < *l*
3 ≤ D ≤ 25	+ 1 0	+ 3 0	+ 5 0	By agreement
25 < D ≤ 100	+ 2 0	+ 5 0	+ 7 0	
100 < D ≤ 450	+ 3 0	+ 5 0	+ 10 0	

* Values are referred from Table 18 of EN 12449:1999

Dimensions: EN 12449:1999*
Tolerances on fixed lengths, tube in coils (not level wound)

Specified length L (m)	Tolerance %
L ≤ 50	+ 2 0
50 < *L* ≤ 100	+ 3 0
100 < *L*	+ 5 0

* Values are referred from Table 19 of EN 12449:1999

Dimensions: EN 12449:1999*
Tolerances on diameter including deviation from circular form, tube in coils

Nominal outside diameter *D* (mm)	Tolerances on nominal diameter including deviation from circular form	Applicable for coil inside diameter min.
3 ≤ D ≤ 6	± 0,30	400
6 < D ≤ 10	± 0,50	600
10 ≤ D ≤ 20	± 0,70	800
20 ≤ D ≤ 30	± 0,90	1000

* Values are referred from Table 20 of EN 12449:1999

Dimensions: EN 12449:1999* **Tolerances on straightness**		
Ratio of	**Depth of arc (see Figure 1)**	
	h_1 in any length l_1 of 1000 mm max.	h_2 in any length l_2 of 400 mm max.
r ≤ 5	2	0,8
5 < r ≤ 10	3	1,2
10 < r ≤ 20	4	1,6
20 < r ≤ 40	5	2,0
40 < r	6	2,5

* Values are referred from Table 21 of EN 12449:1999

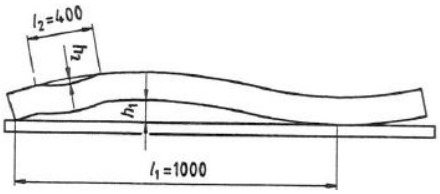

Figure 1 - Measurement of straightness from EN 12449:1999

Dimensions: EN 12449:1999* **Sampling rate**	
Mass per unit length kg/m	**Size of inspection lot for one test sample** kg
$\bar{\lambda}_m$ ≤ 0,25	≤ 500
0,25 < $\bar{\lambda}_m$ ≤ 5	≤ 1000
5 < $\bar{\lambda}_m$	≤ 2500

* Values are referred from Table 22 of EN 12449:1999