

Datasheet: EN CuSn8 / CW453K Classic Bronze Bars & Rods for general purposes Alumeco ApS 02-04-2025			Internal alloy name: CW453K Metal: Bronze Chemical Symbol: CuSn8 EN: CuSn8 UNS: C52100 SIS: 5431 GB: QSn8-0,3 JIS: C5210 Also known as: - Alloy type: Classic bronze					
Main usage: - Electrical connectors and switch elements - Components for textile machines, paper and chemical industry - Clutches - Gears, bolts and screws - High performance springs			Important norms and literature: General Standards EN 12163:2024: Copper and copper alloys – Rod for general purposes Geometric Tolerance EN 12163:2024: Copper and copper alloys – Rod for general purposes EN 12167:2016: Copper and copper alloys – Profiles and bars for general purposes					
Main properties: - Better corrosion resistance compared to bronzes with lower tin-content - High strength and wear resistance - Good spring properties								
Chemical composition in %: EN 12163:2024								
Cu	Sn	P	Fe	Ni	Pb	Zn	Other	
Rest	7,5 – 8,5	0,01 – 0,4	Max. 0,1	Max. 0,2	Max. 0,02	Max. 0,2	Max. 0,2	
Mechanical properties: EN 12163:2024								
Material Condition	Diameter	Width across-flats	Tensile strength R _m	0,2% proof strength R _{p0,2}	Elongation			Hardness HBW
	mm	mm	MPa Min.	MPa	A _{100mm}	Min. % A _{11,3}	A	
R390	2 – 60	2 – 60	390	Max. 280	35	40	45	-
H085	2 – 60	2 – 60	-	-	-	-	-	85 – 125
R450	2 – 50	2 – 50	450	Min. 280	18	22	26	-
H135	2 – 50	2 – 50	-	-	-	-	-	135 – 165
R550	2 – 12	2 – 12	550	Min. 400	10	12	15	-
H160	2 – 12	2 – 12	-	-	-	-	-	160 – 190
R620	2 – 8	-	620	Min. 500	5	8	-	-
H180	2 – 8	-	-	-	-	-	-	Min. 180
R750	2 – 4	-	750	Min. 680	-	-	-	-
H210	2 – 4	-	-	-	-	-	-	Min. 210
* Information values only;								
Physical properties:								
Density (20 °C)	Solidification range	Electrical conductivity	Thermal conductivity (20 °C)	Thermal expansion (20 - 300 °C)	E – modulus (20 °C)			
g/cm ³	°C	%IACS	W/m K	µm m ⁻¹ K ⁻¹	N / mm ²			
8,79	860 – 1040	12,9	67	18	109000			
Properties and information's (3 Excellent; 2 Good; 1 Poor/not recommendable)								
Machinability (Zerspanbarkeitsindex): 20* * (CuZn39Pb3 = 100)			Joining Methods: Soldering: 2-3 Brazing: 2-3 Oxy-acetylene welding: 1 Gas-shielded arc welding: 2 TIG welding: 2 MIG welding: 2 Gluing/adhesion: 1-2			Surface Treatment: Polishing: Mechanical: 2 Electrolytic/chemical: 2 Galvanizing: 2-3 Hot Dipping: 2-3		
Forming Methods: Hot Formability: 1 Cold Formability: 2								
Corrosion resistance: Atmosphere: 2-3 Waters and alkaline: 2 Acids, Ammonia, etc.: 1								

Tolerances for Bars of CW453K (Rods below)

Dimensions: EN 12167:2016*

Tolerances on width and thickness of bar

Nominal thickness t (mm)	Tolerance on width	Tolerance on thickness for range of thickness (mm)					
		3 < t ≤ 6	6 < t ≤ 10	10 < t ≤ 18	18 < t ≤ 30	30 < t ≤ 50	50 < t ≤ 60
Class A tolerance							
3 ≤ t ≤ 18	± 0,27	± 0,18	± 0,22	± 0,27	-	-	-
18 < t ≤ 30	± 0,33	± 0,18	± 0,22	± 0,27	± 0,33	-	-
30 < t ≤ 50	± 0,62	± 0,22	± 0,27	± 0,33	± 0,45	± 0,62	-
50 < t ≤ 80	± 1,20	± 0,27	± 0,33	± 0,45	± 0,52	± 0,74	± 1,00
80 < t ≤ 120	± 2,20	± 0,33	± 0,45	± 0,52	± 0,74	± 1,00	± 1,20
Class B tolerance							
3 ≤ t ≤ 18	± 0,15	± 0,10	± 0,12	± 0,15	-	-	-
18 < t ≤ 30	± 0,22	± 0,10	± 0,12	± 0,15	± 0,22	-	-
30 < t ≤ 50	± 0,30	± 0,13	± 0,15	± 0,18	± 0,22	± 0,30	-
50 < t ≤ 80	± 0,37	± 0,16	± 0,18	± 0,22	± 0,30	± 0,37	-
80 < t ≤ 120	± 0,45	± 0,18	± 0,22	± 0,27	± 0,35	± 0,45	-

* Values are referred from Table 17 of EN 12167:2016

Dimensions: EN 12167:2016*

Tolerances on length of bar

Nominal width w (mm)	Preferred (available) lengths (mm)	Tolerance on length (mm)
$3 \leq w \leq 18$	3000, 4000	± 50
$18 < w \leq 30$	3000, 4000	± 100
$30 < w \leq 50$	2000, 3000, 4000	± 150
$50 < w \leq 80$	2000, 3000	± 200
$80 < w \leq 120$	1000, 2000	± 200

* Values are referred from Table 18 of EN 12167:2016

Dimensions: EN 12167:2016*

Tolerances on straightness of bar, for widths 10 mm and over

Tolerance class	Maximum deviation from straightness (mm)	
	Localized over any 400 mm length	Over whole length L of bar in metres ($L \geq 1m$)
A	2,4	$6,0 * L$
B	1,6	$4,0 * L$
C	0,8	$2,0 * L$

* Values are referred from Table 19 of EN 12167:2016

Dimensions: EN 12167:2016*

Maximum twist of bar

Nominal width w (mm)	Maximum permitted twist V in any 1000 mm length of bar (See Figure 2 in EN 12167:2016)		
	Class A	Class B	Class C
$3 \leq w \leq 18$	2,0	1,5	1,0
$18 < w \leq 30$	3,0	2,3	1,5
$30 < w \leq 50$	4,0	3,0	2,0
$50 < w \leq 80$	6,0	4,5	3,0
$80 < w \leq 120$	9,0	9,0	4,5

For bar of total length greater than 2000 mm, the permitted twist over the total length shall be twice the appropriate maximum given in the table for "in any 1000 mm".

* Values are referred from Table 20 of EN 12167:2016

Dimensions: EN 12167:2016*

Corner radii of bar

Nominal thickness t (mm)	Radii of corners	
	Sharp max.	Rounded range
$3 \leq t \leq 6$	0,3	0,3 – 0,5
$6 < t \leq 10$	0,4	0,4 – 0,8
$10 < t \leq 18$	0,5	0,5 – 1,2
$18 < t \leq 30$	0,6	0,6 – 1,8
$30 < t \leq 40$	0,7	0,7 – 2,8
$40 < t \leq 60$	0,8	0,8 – 4,0

NOTE: A bar having rounded corners of radius greater than those covered by this table is considered to be a profile

* Values are referred from Table 21 of EN 12167:2016

Tolerances for Rods of CW453K

Dimensions: EN 12163:2024*

Dimensional tolerances for rod

Nominal diameter or width across-flats	Tolerances	
	Class A	Class B
$1,6 \leq d/w \leq 3$	$\pm 0,10$	$\pm 0,05$
$3 < d/w \leq 6$	$\pm 0,15$	$\pm 0,08$
$6 < d/w \leq 10$	$\pm 0,20$	$\pm 0,11$
$10 < d/w \leq 18$	$\pm 0,25$	$\pm 0,14$
$18 < d/w \leq 30$	$\pm 0,30$	$\pm 0,17$
$30 < d/w \leq 50$	$\pm 0,60$	$\pm 0,20$
$50 < d/w \leq 80$	$\pm 0,70$	$\pm 0,37$

* Values are referred from Table 17 of EN 12163:2024

Dimensions: EN 12163:2024*

Tolerances on straightness of rod

Nominal diameter or width across-flats	Maximum deviation from straightness (See Figure 1 in EN 12163:2024)	
	h_2 depth of arch in any length l_2 of 400 mm	h_1 depth of arch in any length l_1 of 1000 mm
$10 \leq d/w \leq 50$	2,5	6,0

* Values are referred from Table 18 of EN 12163:2024

Dimensions: EN 12163:2024*

Corner radii for square and polygonal rod

Nominal width across-flats	Radii for sharp and rounded corners	
	Sharp max.	Rounded range
$1,6 \leq w \leq 3$	0,2	0,2 – 0,3
$3 < w \leq 6$	0,3	0,3 – 0,5
$6 < w \leq 10$	0,4	0,4 – 0,8
$10 < w \leq 18$	0,5	0,5 – 1,2
$18 < w \leq 30$	0,6	0,6 – 1,8
$30 < w \leq 50$	0,7	0,7 – 2,8
$50 < w \leq 80$	0,8	0,8 – 4,0

* Values are referred from Table 19 of EN 12163:2024

Dimensions: EN 12163:2024*

Maximum twist of square and polygonal rod

Nominal width across-flats w	Maximum permitted twist V in any 1 m length of rod
$10 \leq w \leq 18$	2,0
$18 < w \leq 30$	3,0
$30 < w \leq 60$	4,0

* Values are referred from Table 20 of EN 12163:2024

Dimensions: EN 12163:2024*

Sampling rate

Nominal width across-flats w (mm)	Mass of inspection lot for one test sample kg
$w \leq 25$	≤ 1000
$25 < w$	≤ 2000

* Values are referred from Table 21 of EN 12163:2024