

Datasheet: EN CuAl10Fe5Ni5 / CC333G Classic Bronze Bars & Rods for general purposes Alumeco ApS 02-04-2025				Internal alloy name: CC333G Metal: Bronze Chemical Symbol: CuAl10Fe5Ni5 EN: CuAl10Fe5Ni5-C UNS: C95800 SIS: - GB: - JIS: - Also known as: Aluminium Bronze Alloy type: Classic bronze																															
Main usage: - Bearings and sliding elements - Highly stressed components, e.g. worm and helical wheels/gears - Pump housing and components, fittings - Marine operation, propeller				Important norms and literature: General Standards EN 1982:2024: Copper and copper alloys – Ingots and castings 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: - High strength - Good wear resistance - Good resistance to corrosion against air, water/seawater and some weak acids																																			
Chemical composition in %: EN 1982:2024 <table><tr><td>Cu</td><td>Al</td><td>Fe</td><td>Mn</td><td>Ni</td><td>Bi</td><td>Cr</td><td>Mg</td><td>Pb</td><td>Si</td><td>Sn</td><td>Zn</td></tr><tr><td>76 – 83</td><td>8,5 – 10,5</td><td>4,0 – 5,5</td><td>Max. 3,0</td><td>4,0 – 6,0</td><td>Max. 0,01</td><td>Max. 0,05</td><td>Max. 0,05</td><td>Max. 0,03</td><td>Max. 0,1</td><td>Max. 0,1</td><td>Max. 0,50</td></tr></table>												Cu	Al	Fe	Mn	Ni	Bi	Cr	Mg	Pb	Si	Sn	Zn	76 – 83	8,5 – 10,5	4,0 – 5,5	Max. 3,0	4,0 – 6,0	Max. 0,01	Max. 0,05	Max. 0,05	Max. 0,03	Max. 0,1	Max. 0,1	Max. 0,50
Cu	Al	Fe	Mn	Ni	Bi	Cr	Mg	Pb	Si	Sn	Zn																								
76 – 83	8,5 – 10,5	4,0 – 5,5	Max. 3,0	4,0 – 6,0	Max. 0,01	Max. 0,05	Max. 0,05	Max. 0,03	Max. 0,1	Max. 0,1	Max. 0,50																								
Mechanical properties: EN 1982:2024 <table><tr><td>Casting process and designation</td><td>Tensile Strength R_m</td><td>0,2% proof strength R_{p0,2}</td><td>Elongation A</td><td>Hardness HBW</td></tr><tr><td></td><td>MPa Min.</td><td>MPa Min.</td><td>% Min.</td><td>Min.</td></tr><tr><td>Continuous GC</td><td>650</td><td>280</td><td>13</td><td>150</td></tr><tr><td>Centrifugal GZ</td><td>650</td><td>280</td><td>13</td><td>150</td></tr></table> * Information values only;												Casting process and designation	Tensile Strength R _m	0,2% proof strength R _{p0,2}	Elongation A	Hardness HBW		MPa Min.	MPa Min.	% Min.	Min.	Continuous GC	650	280	13	150	Centrifugal GZ	650	280	13	150				
Casting process and designation	Tensile Strength R _m	0,2% proof strength R _{p0,2}	Elongation A	Hardness HBW																															
	MPa Min.	MPa Min.	% Min.	Min.																															
Continuous GC	650	280	13	150																															
Centrifugal GZ	650	280	13	150																															
Physical properties: <table><tr><td>Density (20 °C)</td><td>Solidification range</td><td>Electrical conductivity</td><td>Thermal conductivity (20 °C)</td><td>Thermal expansion (20 - 300 °C)</td><td>Annealing temperature</td><td>E – modulus (20 °C)</td></tr><tr><td>g/cm³</td><td>°C</td><td>%IACS</td><td>W/m K</td><td>µm m⁻¹ K⁻¹</td><td>°C</td><td>N / mm²</td></tr><tr><td>7,64</td><td>1040 – 1060</td><td>7</td><td>42</td><td>17</td><td>-</td><td>114000</td></tr></table>												Density (20 °C)	Solidification range	Electrical conductivity	Thermal conductivity (20 °C)	Thermal expansion (20 - 300 °C)	Annealing temperature	E – modulus (20 °C)	g/cm ³	°C	%IACS	W/m K	µm m ⁻¹ K ⁻¹	°C	N / mm ²	7,64	1040 – 1060	7	42	17	-	114000			
Density (20 °C)	Solidification range	Electrical conductivity	Thermal conductivity (20 °C)	Thermal expansion (20 - 300 °C)	Annealing temperature	E – modulus (20 °C)																													
g/cm ³	°C	%IACS	W/m K	µm m ⁻¹ K ⁻¹	°C	N / mm ²																													
7,64	1040 – 1060	7	42	17	-	114000																													
Properties and information's (3 Excellent; 2 Good; 1 Poor/not recommendable) <table><tr><td> Machinability (Zerspanbarkeitsindex): 50* *(CuZn39Pb3 = 100) Forming Methods: Hot Formability: 1 Cold Formability: 1 Corrosion resistance: Atmosphere: 2-3 Waters and alkaline: 2 Acids, Ammonia, etc.: 1 </td><td> Joining Methods: Soldering: 2 Brazing: 1-2 Oxy-acetylene welding: 1 Gas-shielded arc welding: 2 TIG welding: 2 MIG welding: 2 Gluing/adhesion: 2 </td><td> Surface Treatment: Polishing: Mechanical: 1-2 Electrolytic/chemical: 2 Galvanizing: 2 Hot Dipping: 2 </td></tr></table>												Machinability (Zerspanbarkeitsindex): 50* *(CuZn39Pb3 = 100) Forming Methods: Hot Formability: 1 Cold Formability: 1 Corrosion resistance: Atmosphere: 2-3 Waters and alkaline: 2 Acids, Ammonia, etc.: 1	Joining Methods: Soldering: 2 Brazing: 1-2 Oxy-acetylene welding: 1 Gas-shielded arc welding: 2 TIG welding: 2 MIG welding: 2 Gluing/adhesion: 2	Surface Treatment: Polishing: Mechanical: 1-2 Electrolytic/chemical: 2 Galvanizing: 2 Hot Dipping: 2																					
Machinability (Zerspanbarkeitsindex): 50* *(CuZn39Pb3 = 100) Forming Methods: Hot Formability: 1 Cold Formability: 1 Corrosion resistance: Atmosphere: 2-3 Waters and alkaline: 2 Acids, Ammonia, etc.: 1	Joining Methods: Soldering: 2 Brazing: 1-2 Oxy-acetylene welding: 1 Gas-shielded arc welding: 2 TIG welding: 2 MIG welding: 2 Gluing/adhesion: 2	Surface Treatment: Polishing: Mechanical: 1-2 Electrolytic/chemical: 2 Galvanizing: 2 Hot Dipping: 2																																	

Tolerances for Bars of CC333G (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 CC333G

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