

Copper and Copper Alloy Ingots and Castings—Compositions and Uses (BS EN 1982 and Comparison with BS 1400)

Description	EN Number for Castings	EN Symbol for Castings	Nearest Equiv. in Old BS 1400	Cu %	Al %	Fe %	Mn %	Ni %	P %	Pb %	Si %	Sn %	Zn %	Others %	Characteristics and Uses
Copper	CC040A	Cu-C	HCC1	Not specified	-	-	-	-	-	-	-	-	-	-	Composition of this copper grade is not specified. Electrical and thermal applications. Additionally specified by min. conductivity requirements, e.g. 93-99% IACS
Copper Alloys, Low Alloyed	CC140C	CuCr1-C	CC1-TF	Rem.	-	-	-	-	-	-	-	-	-	0.4-1.2 Cr	Electrical and thermal applications. Additionally specified by min. conductivity requirements, e.g. 93-99% IACS
Miscellaneous Copper Alloys	CC212E	CuMn11Al8Fe3Ni3-C	CMA1	68.0-77.0	7.0-9.0	2.0-4.0	8.0-15.0	1.5-4.5	-	0.05	0.1	0.5	1.0	-	Seawater handling components, propellers.
Miscellaneous Copper Alloys	CC245E	CuSi4Zn4MnP-C	-	Rem	0.3	0.3	0.03-0.09	0.5-1.0	0.05-0.15	0.10	2.5-4.5	0.3	1.0-7.0	-	Approved for drinking water contact under 4MS. Water fittings and valves.
Miscellaneous Copper Alloys	CC246E	CuSi4Zn9MnP-C	-	Rem	0.3	0.3	0.03-0.09	0.5-1.0	0.05-0.15	0.10	2.5-4.5	0.3	7.0-11.0	-	Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-aluminium Alloys (Aluminium Bronze)	CC330G	CuAl9-C	-	88.0-92.0	8.0-10.5	1.2	0.50	1.0	-	0.30	0.20	0.30	0.50	-	Resists tarnishing. Building and decorative components.
Copper-aluminium Alloys (Aluminium Bronze)	CC331G	CuAl10Fe2-C	AB1	83.0-89.5	8.5-10.5	1.5-3.5	1.0	1.5	-	0.10	0.2	0.20	0.50	-	Strong, corrosion resistant. Seawater-pumps, bearings, propellers, heat exchangers, pipework
Copper-aluminium Alloys (Aluminium Bronze)	CC332G	CuAl10Ni3Fe2-C	-	80.0-86.0	8.5-10.5	1.0-3.0	2.0	1.5-4.0	-	0.10	0.2	0.20	0.50	-	For castings intended to be welded, the max. Pb content shall be 0.03%. Strong, corrosion resistant. Seawater-pumps, bearings, propellers, heat exchangers, pipework
Copper-aluminium Alloys (Aluminium Bronze)	CC333G	CuAl10Fe5Ni5-C	AB2	76.0-83.0	8.5-10.5	4.0-5.5	3.0	4.0-6.0	-	0.03	0.1	0.1	0.50	0.05 Cr	For permanent mould castings, the min. Fe content shall be 3.0% and the min. Ni shall be 3.7%. Strong, corrosion resistant. Seawater-pumps, bearings, propellers, heat exchangers, pipework
Copper-aluminium Alloys (Aluminium Bronze)	CC334G	CuAl11Fe6Ni6-C	-	72.0-82.5	10.0-12.0	4.0-7.0	2.5	4.0-7.5	-	0.05	0.1	0.2	0.50	-	Strong, corrosion resistant. Seawater-pumps, bearings, propellers, heat exchangers, pipework
Copper-nickel Alloys	CC380H	CuNi10Fe1Mn1-C	-	84.5 Min.	0.01	1.0-1.8	1.0-1.5	9.0-11.0	-	0.03	0.10	-	0.5	-	High strength and corrosion resistance for the most arduous marine applications. Pipe fittings and flanges in chemical engineering.
Copper-nickel Alloys	CC381H	CuNi30Fe1Mn1-C	-	64.5 Min	0.01	0.5-1.5	0.6-1.2	29.0-31.0	0.01	0.03	0.1	-	0.5	-	High strength and corrosion resistance for the most arduous marine applications. Pipe fittings and flanges in chemical engineering.
Copper-nickel Alloys	CC382H	CuNi30Cr2FeMnSi-C	CN1	Rem.	0.01	0.5-1.0	0.5-1.0	29.0-32.0	0.01	0.005	0.15-0.50	-	0.2	1.5 -2.0 Cr 0.25 Ti 0.15 Zr	High strength and corrosion resistance for the most arduous marine applications. Pipe fittings and flanges in chemical engineering.
Copper-nickel Alloys	CC383H	CuNi30Fe1Mn1NbSi-C	CN2	Rem.	0.01	0.5-1.5	0.6-1.2	29.0-31.0	0.01	0.01	0.3-0.7	-	0.50	0.5-1.0 Nb	High strength and corrosion resistance for the most arduous marine applications. Pipe fittings and flanges in chemical engineering.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC480K	CuSn10-C	CT1	88.0-90.0	0.01	0.2	0.10	2.0	0.2	1.0	0.02	9.0-11.0	0.5	0.2 Sb	Gears and general bearing applications offering higher corrosion/erosion resistance than gunmetals.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC481K	CuSn11P-C	PB1	87.0-89.5	0.01	0.10	0.05	0.10	0.5-1.0	0.25	0.01	10.0-11.5	0.05	0.05 Sb	Gears and general bearing applications offering higher corrosion/erosion resistance than gunmetals.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC482K	CuSn11Pb2-C	-	83.5-87.0	0.01	0.20	0.2	2.0	0.40	0.7-2.5	0.01	10.5-12.5	2.0	0.2 Sb	Gears and general bearing applications offering higher corrosion/erosion resistance than gunmetals. Lead gives improved machinability.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC483K	CuSn12-C	PB2	85.0-88.5	0.01	0.2	0.2	2.0	0.60	0.7	0.01	11.0-13.0	0.5	0.15 Sb	Gears and general bearing applications offering higher corrosion/erosion resistance than gunmetals.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC484K	CuSn12Ni2-C	CT2	84.5-87.5	0.01	0.20	0.2	1.5-2.5	0.05-0.40	0.3	0.01	11.0-13.0	0.4	0.1 Sb	Gears and general bearing applications offering higher corrosion/erosion resistance than gunmetals. Nickel increases strength and hardness.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC490K	CuSn3Zn8Pb5-C	LG1	81.0-86.0	0.01	0.5	-	2.0	0.05	3.0-6.0	0.01	2.0-3.5	7.0-9.5	0.30 Sb	Leaded gunmetals giving good corrosion resistance with moderate strength and good castability. Applications include pumps, valves and bearings.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC491K	CuSn5Zn5Pb5-C	LG2	83.0-87.0	0.01	0.3	-	2.0	0.10	4.0-6.0	0.01	4.0-6.0	4.0-6.0	0.25 Sb	Leaded gunmetals giving good corrosion resistance with moderate strength and good castability. Applications include pumps, valves and bearings.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC492K	CuSn7Zn2Pb3-C	LG4	85.0-89.0	0.01	0.2	-	2.0	0.10	2.5-3.5	0.01	6.0-8.0	1.5-3.0	0.25 Sb	Leaded gunmetals giving good corrosion resistance with moderate strength and good castability. Applications include pumps, valves and bearings.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC493K	CuSn7Zn4Pb7-C	-	81.0-85.0	0.01	0.2	-	2.0	0.10	5.0-8.0	0.01	6.0-8.0	2.0-5.0	0.3 Sb	Leaded gunmetals giving good corrosion resistance with moderate strength and good castability. Applications include pumps, valves and bearings.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC494K	CuSn5Pb9-C	LB4	80.0-87.0	0.01	0.25	0.2	2.0	0.10	8.0-10.0	0.01	4.0-6.0	2.0	0.5 Sb	Leaded tin bronzes whose plasticity increases with lead content.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC495K	CuSn10Pb10-C	LB2	78.0-82.0	0.01	0.25	0.2	2.0	0.10	8.0-11.0	0.01	9.0-11.0	2.0	0.5 Sb	Leaded tin bronzes whose plasticity increases with lead content.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC496K	CuSn7Pb15-C	LB1	74.0-80.0	0.01	0.25	0.20	0.5-2.0	0.10	13.0-17.0	0.01	6.0-8.0	2.0	0.5 Sb	Leaded tin bronzes whose plasticity increases with lead content.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC497K	CuSn5Pb20-C	LB5	70.0-78.0	0.01	0.25	0.20	0.5-2.5	0.10	18.0-23.0	0.01	4.0-6.0	2.0	0.75 Sb	Leaded tin bronzes whose plasticity increases with lead content.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC498K	CuSn6Zn4Pb2-C	-	86.0-90.0	0.01	0.25	-	1.0	0.05	1.0-2.0	0.01	5.5-6.5	3.0-5.0	0.25 Sb	Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-tin Alloys (Gunmetal, Phosphor Bronze and Leaded Bronze)	CC499K	CuSn5Zn5Pb2-C	-	84.0-88.0	0.01	0.3	-	0.60	0.04	3.0	0.01	4.0-6.0	4.0-6.0	0.10 Sb	Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-zinc Alloys, (Complex Brasses)	CC750S	CuZn33Pb2-C	SCB3	63.0-67.0	0.01	0.8	0.2	1.0	0.05	1.0-3.0	0.05	1.5	Rem.	-	General purpose applications, including electrical. Conductivity IACS 20%
Copper-zinc Alloys, (Complex Brasses)	CC751S	CuZn33Pb2Si-C	DZR2	63.5-66.0	0.1	0.25-0.5	0.15	0.8	-	0.8-2.2	0.65-1.1	0.8	Rem.	0.05 Sb	Dezincification resistant. Water fittings for aggressive waters (not approved for drinking water contact under 4MS)
Copper-zinc Alloys, (Complex Brasses)	CC752S	CuZn35Pb2Al-C	DZR1	61.5-64.5	0.3-0.70	0.3	0.1	0.2	-	1.5-2.2	0.02	0.3	Rem.	0.04-0.14 As 0.14 Sb	Dezincification resistant. Water fittings for aggressive waters (not approved for drinking water contact under 4MS)
Copper-zinc Alloys, (Complex Brasses)	CC753S	CuZn37Pb2Ni1AlFe-C	-	58.0-61.0	0.4-0.8	0.5-0.8	0.20	0.5-1.2	0.02	1.8-2.50	0.05	0.8	Rem.	0.05 Sb	Fine grained, freely machinable.
Copper-zinc Alloys, (Complex Brasses)	CC754S	CuZn39Pb1Al-C	DCB3	58.0-63.0	0.8	0.7	0.5	1.0	0.02	0.5-2.5	0.05	1.0	Rem.	-	Conductivity IACS 20%. General & electrical purposes.
Copper-zinc Alloys, (Complex Brasses)	CC755S	CuZn39Pb1AlB-C	-	59.5-61.0	0.4-0.7	0.05-0.2	0.05	0.2	-	1.2-1.7	0.05	0.3	Rem.	-	Conductivity IACS 20%. Boron is used for grain refining, to give added strength for thin sections. General & electrical purposes.
Copper-zinc Alloys, (Complex Brasses)	CC757S	CuZn39Pb1AlB-C	-	58.0-63.0	0.3-0.9	0.3	0.05	0.2	-	0.2-1.5	0.05	0.5	Rem.	-	Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-zinc Alloys, (Complex Brasses)	CC760S	CuZn15As-C	SCB6	83.0-88.0	0.01	0.15	0.1	0.1	-	0.5	0.02	0.3	Rem.	0.05-0.15 As	Brazable. Good corrosion resistance.
Copper-zinc Alloys, (Complex Brasses)	CC761S	CuZn16Si4-C	-	78.0-83.0	0.1	0.6	0.2	1.0	0.03	0.8	3.0-5.0	0.3	Rem.	0.05 Sb	Silicon brass for valves and water fittings (not approved for drikng water contact under 4MS)
Copper-zinc Alloys, (Complex Brasses)	CC762S	CuZn25Al5Mn4Fe3-C	HTB3	60.0-67.0	3.0-7.0	1.5-4.0	2.5-5.0	3.0	0.03	0.2	0.1	0.2	Rem.	0.03 Sb	High tensile brasses.
Copper-zinc Alloys, (Complex Brasses)	CC763S	CuZn32Al2Mn2Fe1-C	-	59.0-67.0	1.0-2.5	0.5-2.0	1.0-3.5	2.5	-	1.5	1.0	1.0	Rem.	0.08 Sb	High tensile brasses.
Copper-zinc Alloys, (Complex Brasses)	CC764S	CuZn34Mn3Al2Fe1-C	-	55.0-66.0	1.0-3.0	0.5-2.5	1.0-4.0	3.0	0.03	0.3	0.1	0.3	Rem.	0.05 Sb	High tensile brasses.
Copper-zinc Alloys, (Complex Brasses)	CC765S	CuZn35Mn2Al1Fe1-C	HTB1	57.0-65.0	0.5-2.5	0.5-2.0	0.5-3.0	6.0	0.03	0.5	0.1	1.0	Rem.	0.08 Sb	High tensile brasses. Conductivity IACS 20%
Copper-zinc Alloys, (Complex Brasses)	CC766S	CuZn37Al1-C	-	60.0-64.0	0.3-1.8	0.5	0.5	2.0	-	0.05	0.6	0.50	Rem.	0.1 Sb	General purpose, high quality engineering applications.
Copper-zinc Alloys, (Complex Brasses)	CC767S	CuZn38Al-C	DCB1	59.0-64.0	0.1-0.8	0.5	0.5	1.0	-	0.1	0.2	0.1	Rem.	-	General purpose, high quality engineering applications.
Copper-zinc Alloys, (Complex Brasses)	CC768S	CuZn21Si3P-C	-	75.0-77.0	0.05	0.3	0.05	0.2	0.02-0.10	0.1	2.7-3.5	0.3	Rem.	-	Lead free, machinability 80%. Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-zinc Alloys, (Complex Brasses)	CC770S	CuZn36Pb-C	-	62.0-64.0	0.5-0.7	0.3	0.1	0.2	-	0.2-1.6	-	0.3	Rem.	0.04-0.14 As	Dezincification resistant. Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-zinc Alloys, (Complex Brasses)	CC771S	CuZn36AlAsSb-C	-	62.0-65.0	0.45-0.7	0.2	0.1	0.2	-	0.2	0.02	0.3	Rem.	0.02-0.04 As 0.02-0.05 Sb	Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-zinc Alloys, (Complex Brasses)	CC772S	CuZn36Pb1AlAsSb-C	-	62.0-65.0	0.45-0.7	0.2	0.1	0.2	-	0.2-1.1	0.02	0.3	Rem.	0.02-0.04 As 0.03-0.06 Sb	Approved for drinking water contact under 4MS. Water fittings and valves.
Copper-zinc Alloys, (Complex Brasses)	CC773S	CuZn42Al-C	-	57.0-59.0	0.1-0.3	0.3	0.02	0.02	0.02	0.1	0.02	0.3	Rem.	0.02 Sb	Approved for drinking water contact under 4MS. Water fittings and valves.

About this table

Copper and copper alloy ingots and castings are specified according to BS EN 1982. The EN designations for castings begin 'CC' and the EN symbols end in '-C'. For ingots, the EN designations begin 'CB' and the EN symbols end in '-B'.

The table shows compositions of copper alloy castings, with range or maximum for each element. Note that not all elements listed as impurities are shown here. For the full chemical composition you should refer to the standard or the Copper and copper alloys. Compendium of compositions and products PD CEN/TS 13388. The second gives typical minimum mechanical properties and applicable casting processes.

Where alloys are approved for drinking water contact (see full list of 4MS copper and copper alloy materials), this is indicated in the characteristics and uses column. Note there might be slight variations between compositions of castings and ingots of the same alloy, and that, for castings, properties can vary significantly between processes. For more detail, the appropriate standard(s) should be consulted.

Table notes

Compositions are given as either a range or a maximum.

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