

Table 7: EN 1982 Copper and Copper Alloy Ingots and Castings – Compositions, Uses and Typical Properties

Material Designation		Composition, %, Range or Max											Nearest Equivalent in Old BS 1400	Characteristics and Uses	Typical Minimum Mechanical Properties (Properties vary significantly with method of casting)				Relevant Casting Processes and Designations (4)					
Symbol for Castings (1)	Number for Castings (2)	Cu	Al	Fe	Mn	Ni	P	Pb	Si	Sn	Zn	Others			0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (%)	Hardness (HB)	GM Die Casting	GS Sand	GZ Centri-fugal	GP Pressure Die	GC Continuous	
Copper and Copper-chromium (High Conductivity Coppers)																								
Cu-C	CC040A	Castings shall be made from the copper grades Cu-CATH-2, Cu-ETP-2 and Cu-FRHC											HCC1	Electrical and thermal applications. Additionally specified by minimum conductivity requirements. eg. 93-99% IACS	40	150	25	40	*	*				
CuCr1-C	CC140C	Rem.										0.4 - 1.2 Cr	CC1 - TF		250	350	10	95	*	*				
Copper-zinc (Brasses)																								
CuZn33Pb2-C	CC750S	63.0 - 66.0				1.0		1.0 - 3.0		1.5	Rem.		SCB3	General purpose applications	70	180	12	45	*	*				
CuZn33Pb2Si-C	CC751S	63.5 - 66.0		0.25 - 0.5		0.8		1.3 - 2.2	0.065 - 1.1		Rem.		DZR2	Dezincification resistant alloys for water fittings in areas with aggressive waters.	280	400	5	110			*			
CuZn35Pb2Al-C	CC752S	61.5 - 64.5	0.3 - 0.70					1.5 - 2.5			Rem.	0.15 As	DZR1		120	280	10	70	*		*			
CuZn37Pb2Ni1AlFe-C	CC753S	58.0 - 61.0	0.4 - 0.8	0.5 - 0.8		0.5 - 1.2		1.8 - 2.5		0.8	Rem.		-	Fine grained, freely machinable.	150	300	15	90	*					
CuZn39Pb1Al-C	CC754S	58.0 - 63.0	0.8			1.0		0.5 - 2.5		1.0	Rem.		DCB3	General purposes, extensively for plumbing fittings. Boron in CC755S gives superior strength for thin sections.	120	280	10	70	*	*	*	*		
CuZn39Pb1AlB-C	CC755S	59.5 - 61.0		0.05 - 0.2				1.2 - 1.7			Rem.	(3)	-		180	350	10	90	*		*			
CuZn15As-C	CC760S	83.0 - 88.0									Rem.	0.05 - 0.15 As	SCB6	Brazable. Good corrosion resistance.	70	160	20	45		*				
CuZn16Si4-C	CC761S	78.0 - 83.0	0.1			1.0		0.8	3.0 - 5.0		Rem.		-	Silicon brass for valves and water fittings.	300	500	8	130	*	*		*		
CuZn25Al5Mn4Fe3-C	CC762S	60.0 - 67.0	3.0 - 7.0	1.5 - 4.0	2.5 - 5.0	3.0					Rem.		HTB3	High tensile brasses for engineering castings when good wear resistance is required and high loads encountered.	480	750	5	190	*	*	*		*	
CuZn32Al2Mn2Fe1-C	CC763S	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.		-		200	430	8	110		*		*		
CuZn34Mn3Al2Fe1-C	CC764S	55.0 - 66.0	1.0 - 3.0	0.5 - 2.5	1.0 - 4.0	3.0					Rem.		-		260	600	12	140	*	*	*		*	
CuZn35Mn2Al1Fe1-C	CC765S	57.0 - 65.0	0.5 - 2.5	0.5 - 2.0	0.5 - 3.0	6.0				1.0	Rem.		HTB1		200	480	18	110	*	*	*		*	
CuZn37Al1-C	CC766S	60.0 - 64.0	0.3 - 1.8			2.0					Rem.		-	General purpose, high quality engineering castings.	170	450	25	105	*					
CuZn38Al-C	CC767S	59.0 - 64.0	0.1 - 0.8			1.0					Rem.		DCB1		130	380	30	75	*					
Copper-tin (Gunmetals and Phosphor-Bronzes)																								
CuSn10-C	CC480K	88.0 - 90.0				2.0	0.2	1.0		9.0 - 11.0			CT1	For gears and general bearing applications offering higher corrosion/erosion resistance than gunmetals. The lead in CC482K gives improved machinability and the nickel in CC484K increases strength and hardness.	160	270	10	80	*	*	*		*	
CuSn11P-C	CC481K	87.0 - 89.5					0.5 - 1.0			10.0 - 11.5			PB1		170	310	4	85	*	*	*		*	
CuSn11Pb2-C	CC482K	83.5 - 87.0				2.0	0.40	1.0 - 2.5		10.5 - 12.5	2.0		-		150	280	5	90		*	*		*	
CuSn12-C	CC483K	85.0 - 88.5				2.0	0.60	0.7		11.0 - 13.0			PB2		150	270	5	85	*	*	*		*	
CuSn12Ni2-C	CC484K	84.5 - 87.5				1.5 - 2.5	0.05 - 0.40			11.0 - 13.0			CT2		180	300	10	95		*	*		*	

Notes:

- (1) Symbol finishes 'B' for material in ingot form
- (2) Number begins 'CB' for material in ingot form
- NB. Ingots are not specified for high conductivity coppers
- (3) Boron for grain refining

- (4) GM – permanent mould casting
- GS – sand casting
- GZ – centrifugal casting
- GP – pressure die casting
- GC – continuous casting

Table 7 (continued): EN 1982 Copper and Copper Alloy Ingots and Castings – Compositions, Uses and Typical Properties

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Symbol for Castings (1)	Number for Castings (2)	Cu	Al	Fe	Mn	Ni	P	Pb	Si	Sn	Zn	Others			0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (%)	Hardness (HB)	GM Die Casting	GS Sand	GZ Centri-fugal	GP Pressure Die	GC Continuous
Copper-tin-lead (Gunmetals and Leaded Bronzes)																							
CuSn3Zn8Pb5-C	CC490K	81.0 - 86.0				2.0	0.05	3.0 - 6.0		2.0 - 3.5	7.0 - 9.5		LG1	Leaded gunmetals giving good corrosion resistance with moderate strength and good castability. Applications include pumps, valves and bearings.	100	220	12	70	*	*		*	
CuSn5Zn5Pb5-C	CC491K	83.0 - 87.0				2.0	0.10	4.0 - 6.0		4.0 - 6.0	4.0 - 6.0		LG2		110	230	10	65	*	*	*	*	
CuSn7Zn2Pb3-C	CC492K	85.0 - 89.0				2.0	0.10	2.5 - 3.5		6.0 - 8.0	1.5 - 3.5		LG4		130	240	12	70	*	*	*	*	
CuSn7Zn4Pb7-C	CC493K	81.0 - 85.0				2.0	0.10	5.0 - 8.0		6.0 - 8.0	2.0 - 5.0		-		120	240	12	70	*	*	*	*	
CuSn5Pb9-C	CC494K	80.0 - 87.0				2.0	0.10	8.0 - 10.0		4.0 - 6.0	2.0		LB4	Leaded tin bronzes whose plasticity increases with lead content for bearings when some measure of plasticity is required and for when there is a risk of scoring mating materials.	80	200	6	60	*	*	*	*	
CuSn10Pb10-C	CC495K	78.0 - 82.0				2.0	0.10	8.0 - 11.0		9.0 - 11.0	2.0		LB2		110	220	5	65	*	*	*	*	
CuSn7Pb15-C	CC496K	74.0 - 80.0				0.5 - 2.0	0.10	13.0 - 17.0		6.0 - 8.0	2.0		LB1		90	200	8	65		*	*	*	
CuSn5Pb20-C	CC497K	70.0 - 78.0				0.5 - 2.0	0.10	18.0 - 23.0		4.0 - 6.0	2.0		LB5		75	175	6	50		*	*	*	
Copper-aluminium (Aluminium Bronzes)																							
CuAl9-C	CC330G	88.0 - 92.0	8.0 - 10.5	1.2	0.50	1.0							-	Resists tarnishing. Building and decorative components.	170	470	15	100	*		*		
CuAl10Fe2-C	CC331G	83.0 - 89.5	8.5 - 10.5	1.5 - 3.5	1.0	1.5							AB1	For highly stressed components in corrosive environments where high wear and shock loads may be encountered. Pumps, bearings, tools, bushings, housings.	200	550	18	130	*	*	*	*	
CuAl10Ni3Fe2-C	CC332G	80.0 - 86.0	8.5 - 10.5	1.0 - 3.0	2.0	1.5 - 4.0							-		220	550	20	120	*	*	*	*	
CuAl10Fe5Ni5-C	CC333G	76.0 - 83.0	8.5 - 10.5	4.0 - 5.5	3.0	4.0 - 6.0							AB2		280	650	12	150	*	*	*	*	
CuAl11Fe6Ni6-C	CC334G	72.0 - 78.0	10.0 - 12.0	4.0 - 7.0	2.5	4.0 - 7.5							-		380	750	5	185	*	*	*		
Copper-manganese-aluminium																							
CuMn11Al8Fe3Ni3-C	CC212E	68.0 - 77.0	7.0 - 9.0	2.0 - 4.0	8.0 - 15.0	1.5 - 4.5							CMA1	Seawater handling components, propellers.	275	630	18	150		*			
Copper-nickel																							
CuNi10Fe1Mn1-C	CC380H	84.5		1.0 - 1.8	1.0 - 1.5	9.0 - 11.0						1.0 Nb	-	High strength and corrosion resistance for the most arduous marine applications. Pipe fittings and flanges in chemical engineering.	100	280	25	70		*	*		*
CuNi30Fe1Mn1-C	CC381H	64.5		0.5 - 1.5	0.6 - 1.2	29.0 - 31.0							-		120	340	18	80		*	*		
CuNi30Cr2FeMnSi-C	CC382H	Rem.		0.5 - 1.0	0.5 - 1.0	29.0 - 32.0			0.15 - 0.50			0.15 Zr 1.5 - 2.0 Cr 0.25 Ti	CN1		250	440	18	115		*			
CuNi30Fe1Mn1NbSi-C	CC383H	Rem.		0.5 - 1.5	0.6 - 1.2	29.0 - 31.0			0.3 - 0.7			0.5 - 1.0 Nb	CN2		230	440	18	115		*			

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