

Brass Tubes—Compositions, Properties and Standards

EN Number	EN Symbol	Nearest Old BS Equiv.	Cu %	Al %	Pb %	Si %	Others %	Zinc	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation %	Hardness (HV)	Remarks
CW500L	CuZn5	CZ125	94.0-96.0	0.02	0.05	-	0.3 Ni	Rem.	130-280	230-340	40-8	50-125	This red brass has very good cold working properties. Electrical conductivity 44% IACS.
CW501L	CuZn10	CZ101	89.0-91.0	0.02	0.05	-	0.3 Ni	Rem.	90-340	260-420	60-20	60-125	This 90/10 brass is used for driving bands for projectiles, architectural hand rails, communication systems wave guides and bellows for fluid and steam systems. Approved for drinking water contact under 4MS.
CW502L	CuZn15	CZ102	84.0-86.0	0.02	0.05	-	0.3 Ni	Rem.	85-360	280-430	50-20	65-140	This 85/15 brass is used for condenser and cooling units, gauges and instrument tubes, musical instruments, and decorative uses.
CW503L	CuZn20	CZ103	79.0-81.0	0.02	0.05	-	0.3 Ni	Rem.	115-450	315-380	55-15	75-135	80/20 brass is used for architectural applications.
CW505L	CuZn30	CZ106	69.0-71.0	0.02	0.05	-	0.3 Ni	Rem.	180-320	280-420	50-10	55-120	70/30 brass is the most ductile of all brass tubes and is used for architectural applications.
CW507L	CuZn36	CZ107	63.5-65.5	0.02	0.05	-	0.3 Ni	Rem.	180-300	290-430	50-12	55-115	2/1 brass has good ductility and used for architectural applications. Approved for drinking water contact under 4MS.
CW508L	CuZn37	CZ108	62.0-64.0	0.05	0.1	-	0.3 Ni	Rem.	120-480	360-540	60-10	75-170	This common brass is used for sanitary and decorative applications and aerials. Approved for drinking water contact under 4MS.
CW509L	CuZn40	CZ109	59.0-61.5	0.05	0.2	-	0.3 Ni	Rem.	110-400	370-470	40-5	75-130	This 60/40 brass has limited cold working properties and architectural applications. Approved for drinking water contact under 4MS.
CW600N	CuZn35Pb1		62.5-64.0	0.05	0.8-1.6	-	0.3 Ni	Rem.	180-340	370-440	45-10	60-120	Machining brass has good to very good cold working properties.
CW601N	CuZn35Pb2	CZ131	62.0-63.5	0.05	1.6-2.5	-	0.3 Ni	Rem.	90-350	340-465	40-10	80-150	The lead content of this free cutting brass gives good machinability but ductility is reduced.
CW602N	CuZn36Pb2As		61.0-63.0	0.05	1.7-2.8	-	0.02-0.15 As 0.3 Ni	Rem.	250-340	290-440	40-10	80-140	Dezincification resistant. Machinability index 70%
CW603N	CuZn36Pb3	CZ124	60.0-62.0	0.05	2.5-3.5	-	0.3 Ni	Rem.	250-350	300-460	35-10	80-140	Free machining brass. Machinability index 100%. Very limited cold working. Approved for drinking water contact under 4MS.
CW604N	CuZn37Pb0.5	-	62.0-64.0	0.05	0.1-0.8	-	0.3 Ni	Rem.	200-320	300-440	45-10	60-120	Low lead, good cold forming. Machinability index 60%.
CW605N	CuZn37Pb1	-	61.0-62.0	0.05	0.8-1.6	-	0.3 Ni	Rem.	200-320	300-440	45-10	60-120	Fair cold forming. Machinability index 70%.
CW607N	CuZn38Pb1	-	60.0-61.0	0.05	0.8-1.6	-	0.3 Ni	Rem.	250-350	340-470	35-10	80-140	Fair cold forming. Machinability index 85%.
CW608N	CuZn38Pb2	-	60.0-61.0	0.05	1.6-2.5	-	0.3 Ni	Rem.	250-350	340-470	35-10	80-140	Fair cold forming. Machinability index 90%.
CW614N	CuZn39Pb3	CZ121Pb3	57.0-59.0	0.05	2.5-3.5	-	0.3 Ni	Rem.	250-370	360-500	25-8	85-150	Very limited cold forming. Machinability index 100%. Approved for drinking water contact under 4MS.
CW617N	CuZn40Pb2	CZ122	57.0-59.0	0.05	1.6-2.5	-	0.3 Ni	Rem.	250-370	360-500	25-8	85-150	Very limited cold forming. Machinability index 90%. Approved for drinking water contact under 4MS.
CW700R	CuZn13Al1Ni1Si1	CZ127	81.0-84.0	0.7-1.2	0.05	0.8-1.3	0.8-1.4 Ni	Rem.	115-330	380-550	50-10	65-170	Aluminium-nickel-silicon brass used for hydraulic and pneumatic control and instrumentation circuits in aviation, offshore and marine applications. Used to transmit high pressure oxygen (non-sparking).
CW702R	CuZn20Al2As	CZ110	76.0-79.0	1.8-2.3	0.05	-	0.02-0.06 As 0.1 Ni	Rem.	115-460	360-560	60-20	75-165	Aluminium brass possesses excellent corrosion resistance in clean seawater and is a favoured alloy for condenser tubes.
CW706R	CuZn28Sn1As	CZ111	70.0-72.5	-	0.05	-	0.02-0.06 As 0.1 Ni 0.9-1.3 Sn	Rem.	110-410	320-460	60-20	75-165	Admiralty brass has good corrosion resistance in brackish water.
CW707R	CuZn30As	CZ126	69.0-71.0	0.02	0.07	-	0.02-0.06 As	Rem.	110-420	310-465	60-20	70-165	70/30 arsenical brass is the standard composition for condenser tubes. The arsenic is added to inhibit dezincification.
CW708R	CuZn31Si1	-	66.0-70.0	-	0.8	0.7-1.3	0.5 Ni	Rem.	200-250	440-490	20-15	110-145	Silicon brass gives good wear resistance.
CW710R	CuZn35Ni3Mn2AlPb	-	58.0-60.0	0.3-1.3	0.2-0.8	0.1	1.5-2.5 Mn 2.0-3.0 Ni	Rem.	290-390	490-540	15-10	125-165	Complex brass, hard and wear resistant.

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CW713R	CuZn37Mn3Al2PbSi	CZ135	57.0-59.0	1.3-2.3	0.2-0.8	0.3-1.3	1.0 Fe 1.5-3.0 Mn 1.0 Ni 0.4 Sn	Rem.	250-350	540-640	10-5	145-195	High tensile strength, good for sliding parts.
CW716R	CuZn38Mn1Al	-	59.0-61.5	0.3-1.3	1	0.5	0.6-1.8 Mn 0.6 Ni	Rem.	200-270	440-510	15-10	115-155	Complex brass with good sliding properties.
CW718R	CuZn39Mn1AlPbSi	-	57.0-59.0	0.3-1.3	0.2-0.8	0.2-0.8	0.8-1.8 Mn 0.5 Ni	Rem.	200-270	440-510	15-10	120-160	Complex silicon brass.
CW723R	CuZn40Mn2Fe1	-	56.5-58.5	0.1	0.5	0.1	0.5-1.5 Fe 0.6 Ni 1.0-2.0 Mn	Rem.	170-270	440-490	15-10	115-155	Complex brass.
CW724R	CuZn21Si3P	-	75.0-77.0	0.05	0.1	2.7-3.5	0.02-0.10 P 0.2 Ni	Rem.	350-450	500-650	15-10	110-210	Lead free, free machining. Approved for drinking water contact under 4MS.

About this table

Compositions given are the EN materials appropriate to designation number. Composition ranges may be outside those of previous BS specifications, therefore compliance should be checked before assuming suitability for applications. 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.

This table includes brasses previously included in BS 2871 'Specification for copper and copper alloys. Tubes':
'Part 2 Tubes for general purposes'
'Part 3 Tubes for heat exchangers'

These brasses are now included in the following EN standards for individual product forms:
EN 12449 'Copper and copper alloys—Seamless, round tubes for general purposes'
EN 12451 'Copper and copper alloys—Seamless, round tubes for heat exchangers'
EN 12452 'Copper and copper alloys—Rolled, finned seamless tubes for heat exchangers'

For more detail, the appropriate standard(s) should be consulted.

Table notes

Compositions are given as either a range or a maximum.
1N/mm² = 1MPa

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