Copper – Specifications, Grades and Properties

Wrought Copper-zinc-lead Alloys (Leaded Brasses) – Compositions, Uses, Typical Properties, Relevant Standards and Machinability

Material Designation		Composition, %, Range or Max							Nearest Old BS Equivalent	Characteristics and Uses	Typical Mechanical Properties				Machinability Index (%)
Symbol	Number	Cu	Al	As	Pb	Sn	Zn	Others & Total Impurities			0.2% Proof Strength (N/mm^2)	Tensile Strength (N/mm^2)	Elongation (%)	Hardness (HV)	
CuZn36Pb3	CW603N	60-62.0			2.5-3.5		Rem.	0.2	CZ124	These alloys have excellent machinability but very limited cold workability. Alloy CW614N is rated as a standard against which other materials are compared. Alloy CW617N is the standard hot forging brass.	160.450	340-580	35-5	90-150	95
CuZn39Pb3	CW614N	57.0-59.0			2.5-3.5		Rem.	0.2	CZ121Pb3		150-420	360-580	25-5	100-160	100
CuZn40Pb2	CW617N	57.0-59.0			1.6-2.5		Rem.	0.2	CZ122		150-420	360-580	25-5	100-160	90
CuZn37Pb2	CW606N	61.0-62.0			1.6-2.5		Rem.	0.2	CZ119, CZ131	These alloys have good machinability and some cold workability for limited bending and riveting.	160.450	300.580	45-5	90-150	70
CuZn38Pb2	CW608N	60.0-61.0			1.6-2.5		Rem.	0.2	CZ120, CZ128		150-450	360-580	40-5	90-150	75
CuZn39Pb2	CW612N	59.0-60.0			1.6-2.5		Rem.	0.2	CZ120 CZ128		150-450	360-580	40-5	90-160	80
CuZn35Pb1	CW600N	62.5-64.0			0.8-1.6		Rem.	0.1	CZ118	These alloys are machinable and have a good to very good cold workability. This group contains the standard alloys for bending, CW610N, and extreme riveting, CW601N.	150-450	300-580	45-10	90-150	50
CuZn35Pb2	CW601N	62.0-63.5			1.6-2.5		Rem.	0.1	CZ119, CZ131		150-350	330-470	30-10	90-130	65
CuZn38Pb1	CW607N	60.0-61.0			0.8-1.6		Rem.	0.2	-		150-420	360-580	30-5	90-150	55
CuZn39Pb0.5	CW610N	59.0-60.5			0.2-0.8		Rem.	0.2	CZ123, CZ137		150-450	360-580	40-5	90-150	50
CuZn39Pb1	CW611N	59.0-60.0			0.8-1.6		Rem.	0.2	CZ129		150-420	360-580	30-5	90-150	60
CuZn36Pb2As	CW602N	61.0-63.0		0.02-0.15	1.7-2.8		Rem.	0.2	CZ132	Dezincification resistant brass with good machinability and moderate hot and cold workability.	120-200	280-450	40-20	80-140	70
CuZn39Pb2Sn	CW613N	59.0-60.0			1.6-2.5	0.2-0.5	Rem.	0.2	-	These alloys have good machinability and limited cold workability.	150-420	360-580	30-5	90-150	75
CuZn40Pb2Sn	CW619N	57.0-59.0			1.6-2.5	0.2-0.5	Rem.	0.2	-		150-420	360-580	25-5	100-160	85
CuZn39Pb3Sn	CW615N	57.0-59.0			2.5-3.5	0.2-0.5	Rem.	0.2	-	These alloys are designed for hot forging.	130-160	340-380	20-12	85-95	95
CuZn40Pb1Al	CW616N	57.0-59.0	0.05-0.30		1.0-2.0		Rem.	0.2	-		130-160	340-380	20-12	85-95	60
CuZn40Pb2Al	CW618N	57.0-59.0	0.05-0.5		1.6-3.0		Rem.	0.2	-	This group of alloys is used for production of profiles by hot extrusion. Aluminium imparts a golden lustre, avoiding need for further polishing. The alloys with more than 1.6% Pb have very good machinability.	-	-	-	-	90
CuZn41Pb1Al	CW620N	57.0-59.0	0.05-0.5		0.8-1.6		Rem.	0.2	-		-	-	-	-	85
CuZn42PbAl	CW612N	57.0-59.0	0.05-0.5		0.2-0.8		Rem.	0.2	-		-	-	-	-	55
CuZn43Pb1A1	CW622N	55.0-57.0	0.05-0.5		0.8-1.6		Rem.	0.2	-		-	-	-	-	60
CuZn43Pb2Al	CW624N	55.0-57.0	0.05-0.5		1.6-3.0		Rem.	0.2	CZ130		-	-	-	-	95
CuZn43Pb2	CW623N	55.0-57.0			1.6-3.0		Rem.	0.2	CZ130		150-220	350-420	30-20	100-130	95
CuZn37Pb0.5	CW604N	62.0-64.0			0.1-0.8		Rem.	0.2	-	For manufacture of plate and tube.	160-450	300-580	45-10	80-150	45
CuZn37Pb1	CW605N	61.0-62.0			0.8-1.6		Rem.	0.2	-	For manufacture of tube and hollow rod.	160-340	340-440	35-10	80-130	50