Wrought Copper-zinc-lead Alloys (Leaded Brasses)—Compositions, Properties, Standards and Uses

EN Number	EN Symbol	Nearest Old BS Equiv.	Cu %	Al %	As %	Pb %	Sn %	Zn %	Others %	0.2% Proof Strength (N/mm^2)	Tensile Strength (N/mm2)	Elong-ation (%)	Hardness (HV)	Machin-ability Index (%)	1652 Plate, Strip, Sheet, Circles	12164 Free Mach-ining Rod	12165 Forging Stock	12166 Wire	12167 Profiles, Rectang-ular Bar	12168 Free Mach-ining Hollow Rod	12420 Forgings	12449 Tubes	Characteristics and Uses
CW600N	CuZn35Pb1	CZ118	62.5-64.0	0.05	-	0.8-1.6	0.1	Rem.	0.3 Ni	150-450	300-580	45-10	90-150	50	HR	HMR		HMR	HMR			HMR	Machinable with good to very good cold workability.
CW601N	CuZn35Pb2	CZ119, CZ131	62.0-63.5	0.05	-	1.6-2.5	0.1	Rem.	0.3 Ni	150-350	330-470	30-10	90-130	65		HMR		HMR	HMR	HMR		HMR	Machinable with good to very good cold workability. Standard alloy for extreme riveting.
CW602N	CuZn36Pb2As	CZ132	61.0-63.0	0.05	0.02-0.15	1.7-2.8	0.1	Rem.	0.3 Ni	120-200	280-450	40-20	80-140	70		HMR	HM		HMR	HMR	HM	HMR	Dezincification resistant brass with good machinability and moderate hot and cold workability.
CW603N	CuZn36Pb3	CZ124	60.0-62.0	0.05	-	2.5-3.5	0.2	Rem.	0.3 Ni	160-450	340-580	35-5	90-150	95		HMR		HMR	HMR	HMR		HMR	Excellent machinability but very limited cold workability.
CW604N	CuZn37Pb0.5	-	62.0-64.0	0.05	-	0.1-0.8	0.2	Rem.	0.3 Ni	160-450	300-580	45-10	80-150	45	HR							HMR	For manufacture of plate and tube.
CW605N	CuZn37Pb1	-	61.0-62.0	0.05	-	0.8-1.6	0.2	Rem.	0.3 Ni	160-340	340-440	35-10	80-130	50						HMR		HMR	For manufacture of tube and hollow rod.
CW606N	CuZn37Pb2	CZ119, CZ131	61.0-62.0	0.05	-	1.6-2.5	0.2	Rem.	0.3 Ni	160-450	300-580	45-5	90-150	70	HR	HMR		HMR	HMR	HMR			Good machinability and some cold workability for limited bending and riveting.
CW607N	CuZn38Pb1		60.0-61.0	0.05	-	0.8-1.6	0.2	Rem.	0.3 Ni	150-420	360-580	30-5	90-150	55		HMR	HM		HMR	HMR	HM	HMR	Machinable with good to very good cold workability.
CW608N	CuZn38Pb2	CZ120, CZ128	60.0-61.0	0.05	-	1.6-2.5	0.2	Rem.	0.3 Ni	150-450	360-580	40-5	90-150	75	HR	HMR	HM	HMR	HMR	HMR		HMR	Good machinability and some cold workability for limited bending and riveting.
CW610N	CuZn39Pb0.5	CZ123, CZ137	59.0-60.5	0.05	-	0.2-0.8	0.2	Rem.	0.3 Ni	150-450	360-580	40-5	90-150	50	HR	HMR	HM	HMR	HMR				Machinable with good to very good cold workability. Standard alloy for bending.
CW611N	CuZn39Pb1	CZ129	59.0-60.0	0.05	-	0.8-1.6	0.2	Rem.	0.3 Ni	150-420	360-580	30-5	90-150	60		HMR	HM		HMR	HMR	HM		Machinable with good to very good cold workability.
CW612N	CuZn39Pb2	CZ120, CZ128	59.0-60.0	0.05	-	1.6-2.5	0.3	Rem.	0.3 Ni	150-450	360-580	40-5	90-160	80	HR	HMR	HM	HMR	HMR	HMR	HM		Good machinability and some cold workability for limited bending and riveting.
CW613N	CuZn39Pb2Sn	-	59.0-60.0	0.1	-	1.6-2.5	0.2-0.5	Rem.	0.3 Ni	150-420	360-580	30-5	90-150	75			HM		HMR		HM		Good machinability and limited cold workability.
CW614N	CuZn39Pb3	CZ121Pb3	57.0-59.0	0.05	-	2.5-3.5	0.3	Rem.	0.3 Ni	150-420	360-580	25-5	100-160	100		HMR	HM	HMR	HMR	HMR	HM	HMR	Excellent machinability but very limited cold workability. Alloy CW614N is rated as a standard against which other materials are compared.
CW615N	CuZn39Pb3Sn	-	57.0-59.0	0.1	-	2.5-3.5	0.2-0.5	Rem.	0.3 Ni	130-160	340-380	20-12	85-95	95									Hot forging.
CW616N	CuZn40Pb1Al	-	57.0-59.0	0.05-0.30	-	1.0-2.0	0.2	Rem.	0.2 Ni	130-160	340-380	20-12	85-95	60			HM				HM		Hot forging.
CW617N	CuZn40Pb2	CZ122	57.0-59.0	0.05	-	1.6-2.5	0.3	Rem.	0.3 Ni	150-420	360-580	25-5	100-160	90		HMR	HM	HMR	HMR	HMR	HM	HMR	Excellent machinability but very limited cold workability. Alloy CW617N is the standard hot forging brass.
CW618N	CuZn40Pb2Al	-	57.0-59.0	0.05-0.5	-	1.6-3.0	0.3	Rem.	0.3 Ni					90									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.
CW619N	CuZn40Pb2Sn	-	57.0-59.0	0.1	-	1.6-2.5	0.2-0.5	Rem.	0.3 Ni	150-420	360-580	25-5	100-160	85									Good machinability and limited cold workability.
CW620N	CuZn41Pb1Al	-	57.0-59.0	0.05-0.5	-	0.8-1.6	0.3	Rem.	0.3 Ni					85					M				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.
CW621N	CuZn42PbAl	-	57.0-59.0	0.05-0.5	-	0.2-0.8	0.3	Rem.	0.3 Ni					55									Profiles by hot extrusion. Aluminium imparts a golden lustre, avoiding need for further polishing.
CW622N	CuZn43Pb1Al	-	55.0-57.0	0.05-0.5	-	0.8-1.6	0.3	Rem.	0.3 Ni					60									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.
CW623N	CuZn43Pb2	CZ130	55.0-57.0	0.05	-	1.6-3.0	0.3	Rem.	0.3 Ni	150-220	350-420	30-20	100-130	95					HMR				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.
CW624N	CuZn43Pb2Al	CZ130	55.0-57.0	0.05-0.5	-	1.6-3.0	0.3	Rem.	0.3 Ni					95					M				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.
CW625N	CuZn35Pb1.5AlAs	-	62.0-64.0	0.5-0.7	0.02-0.15	1.2-1.6	0.3	Rem.	0.2 Ni	200 - 250	280 - 400	30 - 5	70-135			MR	HM		HMR	HMR	HM		DZR with good machinability. Approved for drinking water contact under 4MS.
CW626N	CuZn33Pb1.5AlAs	-	64.0-66.0	0.8-1.0	0.02-0.15	1.2-1.7	0.3	Rem.	0.2 Ni	200 - 250	280 - 400	30 - 5	70-135			MR	HM		HMR	HMR	HM		DZR with good machinability. Approved for drinking water contact under 4MS.

About this table

This table provides information on wrought copper-zinc-lead (leaded brasses) alloys. Compositions, typical mechanical properties, relevant standards, characteristics and uses are shown.

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.

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

Table notes

Compositions are given as either a range or a maximum.
The material conditions defined by the standards are given and—where mandatory—this is indicated

1652, 12167 and 12449 are for general purposes.
1N/mm2 = 1MPa

H—mandatory hardness
M—as manufactured
R—mandatory tensile strength

EN12167 Mechanical properties of profiles are not specified in this standard, indicated as M

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