

Brass Rods and Sections—Compositions, Properties and Standards

EN Number	EN Symbol	Nearest Old BS Equiv.	Cu %	Al %	Fe %	Mn %	Pb %	Si %	Others %	Zn %	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation %	Hardness (HV)	Remarks
CW503L	CuZn20	CZ103	79.0-81.0	0.02	0.05	-	0.05	-	0.3 Ni	Rem.	90-460	340-650	50-5	70-170	Can be deformed extensively by cold working.
CW505L	CuZn30	CZ106	69.0-71.0	0.02	0.05	-	0.05	-	0.3 Ni	Rem.	90-480	370-770	55-3	70-190	Can be deformed extensively by cold working.
CW507L	CuZn36	CZ107	63.5-65.5	0.02	0.05	-	0.05	-	0.3 Ni	Rem.	90-480	370-770	55-3	70-190	Can be deformed extensively by cold working.
CW509L	CuZn40	CZ109	59.0-61.5	0.05	0.2	-	0.2	-	0.3 Ni	Rem.	120-280	340-460	45-25	90-150	60/40 brass will withstand limited amount of cold working and bending.
CW510L	CuZn42	-	57.0-59.0	0.05	0.3	-	0.2	-	0.3 Ni	Rem.	220-350	360-500	20-2	95-170	Lead-free, machinability index 50%.
CW511L	CuZn38As	-	61.5-63.5	0.05	0.1	-	0.2	-	0.02-0.15 As 0.3 Ni	Rem.	200-250	280-400	30-8	70-135	Dezincification resistant.
CW601N	CuZn35Pb2	CZ131	62.0-63.5	0.05	0.1	-	1.6-2.5	-	0.3 Ni	Rem.	140-450	330-570	45-5	70-160	The higher copper and lower lead contents of these alloys improves ductility while retaining free machining characteristics. Can be used for cold heading, extreme riveting. Also known as free cutting brass.
CW602N	CuZn36Pb2As	CZ132	61.0-63.0	0.05	0.1	0.1	1.7-2.8	-	0.02-0.15 As 0.3 Ni	Rem.	110-140	310-370	45-35	70-80	Brass with good hot ductility which is then heat treated to give excellent resistance to dezincification.
CW603N	CuZn36Pb3	CZ124	60.0-62.0	0.05	0.3	-	2.5-3.5	-	0.3 Ni	Rem.	140-320	340-520	40-5	70-160	Excellent machinability combined with sufficient ductility for some cold work. Also known as free cutting brass.
CW606N	CuZn37Pb2	CZ131	61.0-62.0	0.05	0.2	-	1.6-2.5	-	0.3 Ni	Rem.	140-450	330-570	45-5	70-160	The higher copper and lower lead contents of these alloys improves ductility, while retaining free machining characteristics. Can be used for cold heading, riveting. Also known as free cutting brass.
CW608N	CuZn38Pb2	CZ120	60.0-61.0	0.05	0.2	-	1.6-2.5	-	0.3 Ni	Rem.	140-320	340-520	40-15	90-160	Excellent machinability combined with sufficient ductility for some cold work. Also known as free cutting brass.
CW610N	CuZn39Pb0.5	CZ137	59.0-60.5	0.05	0.2	-	0.2-0.8	-	0.3 Ni	Rem.	120-280	340-460	45-25	90-150	60/40 brass will withstand limited amount of cold working and bending.
CW611N	CuZn39Pb1	CZ129	59.0-60.0	0.05	0.2	-	0.8-1.6	-	0.3 Ni	Rem.	120-280	340-460	45-20	90-140	The higher copper and lower lead contents of these alloys improves ductility, while retaining free machining characteristics. Can be used for cold heading, riveting. Also known as free cutting brass.
CW612N	CuZn39Pb2	CZ128	59.0-60.0	0.05	0.3	-	1.6-2.5	-	0.3 Ni	Rem.	140-320	340-520	40-15	90-160	Excellent machinability combined with sufficient ductility for some cold work. Also known as free cutting brass.
CW614N	CuZn39Pb3	CZ121-Pb3	57.0-59.0	0.05	0.3	-	2.5-3.5	-	0.3 Ni	Rem.	110-260	370-460	35-15	90-160	The most suitable material for high-speed machining, but has limited ability to be cold worked. The hardness of sections is typically 115 HV.
CW617N	CuZn40Pb2	CZ122	57.0-59.0	0.05	0.3	-	1.6-2.5	-	0.3 Ni	Rem.	140-310	350-540	40-15	90-160	Excellent machinability combined with sufficient ductility for some cold work. Standard hot forging brass. Also known as free cutting brass.
CW623N	CuZn43Pb2	CZ130	55.0-57.0	0.05	0.3	-	1.6-3.0	-	0.3 Ni	Rem.	160-200	370-430	35-25	90-120	The aluminium containing alloy has a bright yellow colour on the surface of extruded sections, while the manganese containing alloy may be toned to a chocolate brown colour. This brass gives an accentuated uniform improvement to natural oxidation effects and is used for architectural sections.
CW624N	CuZn43Pb2Al	CZ130	55.0-57.0	0.05-0.5	0.3	-	1.6-3.0	-	0.3 Ni	Rem.	160-200	370-430	35-25	90-120	The aluminium containing alloy has a bright yellow colour on the surface of extruded sections, while the manganese containing alloy may be toned to a chocolate brown colour. This brass gives an accentuated uniform improvement to natural oxidation effects and is used for architectural sections.
CW625N	CuZn35Pb1.5AlAs	-	62.0-64.0	0.5-0.7	0.3	0.1	1.2-1.6	-	0.02-0.15 As 0.2 Ni	Rem.	200-250	280-400	30-5	70-135	Dezincification resistant. Approved for drinking water contact under 4MS.
CW626N	CuZn33Pb1.5AlAs	-	64.0-66.0	0.8-1.0	0.3	0.1	1.2-1.7	-	0.02-0.15 As 0.2 Ni	Rem.	200-250	280-400	30-5	70-135	Dezincification resistant. Approved for drinking water contact under 4MS.
CW705R	CuZn25Al5Fe2Mn2Pb	CZ116	65.0-68.0	4.0-5.0	0.5-3.0	0.5-3.0	0.2-0.8	-	1.0 Ni	Rem.	420-490	690-770	20-15	170-220	The alloying additions produce improved mechanical properties. Lead improves machinability. Used for fasteners, valve parts.
CW707R	CuZn30As	CZ105 and CZ126	69.0-71.0	0.02	0.05	0.1	0.07	-	0.02-0.06 As	Rem.	110-170	200-350	55-20	70-90	Brass with good hot ductility which is then heat treated to give excellent resistance to dezincification. The addition of arsenic to 70/30 brass improves resistance to corrosion.
CW711R	CuZn36Pb2Sn1	CZ134	59.5-61.5	-	0.1	-	1.3-2.2	-	0.5-1.0 Sn 0.3 Ni	Rem.	125-170	340-400	40-20	100-150	Tin improves corrosion resistance, especially in sea water. Lead improves machinability. Also known as leaded Naval Brass.
CW712R	CuZn36Sn1Pb	CZ112	61.0-63.0	-	0.1	-	0.2-0.6	-	1.0-1.5 Sn 0.2 Ni	Rem.	125-185	340-430	40-20	100-160	Tin improves corrosion resistance, especially in sea water. Lead improves machinability. Also known as Naval Brass.

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CW713R	CuZn37Mn3Al2PbSi	CZ135	57.0-59.0	1.3-2.3	1	1.5-3.0	0.2-0.8	0.3-1.3	1.0 Ni 0.4 Sn	Rem.	230-340	500-700	10-5	150-200	The alloying additions produce improved mechanical properties. Lead improves machinability. Used for fasteners and valve parts. Silicon addition gives added wear resistance.
CW719R	CuZn39Sn1	CZ133	59.0-61.0	-	0.1	-	0.2	-	0.5-1.0 Sn 0.2 Ni	Rem.	155-280	400-460	30-20	100-145	Tin improves corrosion resistance, especially in sea water. Also known as uninhibited Naval Brass.
CW720R	CuZn40Mn1Pb1	CZ136	57.0-59.0	0.2	0.3	0.5-1.5	1.0-2.0	0.1	0.6 Ni	Rem.	125-200	340-500	40-30	80-115	The aluminium containing alloy has a bright yellow colour on the surface of extruded sections, while the manganese containing alloy may be toned to a chocolate brown colour. This brass gives an accentuated uniform improvement to natural oxidation effects and is used for architectural sections.
CW721R	CuZn40Mn1Pb1AlFeSn	CZ114	57.0-59.0	0.3-1.3	0.2-1.2	0.8-1.8	0.8-1.6		0.2-1.0 Sn 0.3 Ni	Rem.	230-340	430-590	30-20	110-175	The alloying additions produce improved mechanical properties. Lead improves machinability. Used for fasteners and valve parts.
CW722R	CuZn40Mn1Pb1FeSn	CZ115	56.5-58.5	0.1	0.2-1.2	0.8-1.8	0.8-1.6		0.2-1.0 Sn 0.3 Ni	Rem.	230-340	430-590	30-20	110-175	The alloying additions produce improved mechanical properties. Lead improves machinability. Used for fasteners and valve parts.
CW724R	CuZn21Si3P	-	75.0-77.0	0.05	0.3	0.05	0.1	2.7-3.5	0.2 Ni 0.02-0.10 P	Rem.	350-450	500-650	15-10	110-210	Lead-free brass.
CW725R	CuZn33Pb1AlSiAs	-	64.0-67.0	0.1-0.4	0.3	0.1	0.4-0.9	0.1-0.3	0.05-0.08 As 0.2 Ni	Rem.	200-250	290-400	30-8	70-135	Dezincification resistant. Approved for drinking water contact under 4MS.

About this table

The table is designed to assist with the selection of grade for brass rods and sections by providing compositions, mechanical properties and some general remarks. The table also includes EN brass grades previously included in BS 2874 'Specification for copper and copper alloy rods and sections (other than forging stock)' to allow for completeness and continuity.

Compositions given in the tables below are based on the EN designation. 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.

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
EN 12163 'Copper and copper alloys—Rod for general purposes'
EN 12164 'Copper and copper alloys—Rod for free machining purposes'
EN 12167 'Copper and copper alloys—Profiles and rectangular bar for general purpose'
EN 12168 'Copper and copper alloys—Hollow rod for free machining purposes'

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