

Table 14: Brass Rods and Sections - Compositions, Uses and Typical Properties

This table shows only the old BS alloys with their equivalent EN specifications. For alloys not included, see earlier tables.

Designation		Description	Composition, %, Range (Excluding Impurities)									Typical Mechanical Properties (1)				Remarks				
Old BS Near Equivalent	EN		Cu	Al	Fe	Mn	Pb	Si	Others	Zn	0.2% Proof Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation %	Hardness (HV)						
	Symbol														Number					
CZ121-Pb3	CuZn39Pb3	CW614N	High-speed machining brass	57.0-59.0							2.5-3.5			Rem.	110-260	370-460	35-15	90-160	The most suitable materials for high speed machining, but have limited ability to be cold worked. The hardness of sections is typically 115 HV.	
CZ122	CuZn40Pb2	CW617N	Free cutting brasses	57.0-59.0							1.6-2.5			Rem.	140-310	350-540	40-15	90-160	Excellent machinability combined with sufficient ductility for some cold work. CW617N is the standard hot forging brass.	
CZ124	CuZn36Pb3	CW603N		60.0-62.0								2.5-3.5			Rem.	140-320	340-520	40-5		70-160
CZ128	CuZn38Pb2 and CuZn39Pb2	CW608N and CW612N		60.0-61.0 59.0-60.0								1.6-2.5 1.6-2.5			Rem. Rem.	140-320 140-320	340-520 340-520	40-15 40-15		90-160 90-160
CZ131 (superseded CZ119)	CuZn35Pb2 and CuZn37Pb2	CW601N CW606N		62.0-63.5 61.0-62.0								1.6-2.5 1.6-2.5			Rem. Rem.	140-450 140-450	330-570 330-570	45-5 45-5		70-160 70-160
CZ129	CuZn39Pb1	CW611N	Free cutting brasses with improved ductility	59.0-60.0							0.8-1.6			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, etc. CW601N is the standard material for extreme riveting.	
CZ120	CuZn38Pb2	CW608N		60.0-61.0								1.6-2.5			Rem.	140-320	340-520	40-15		90-160
	CuZn39Pb2	CW612N		59.0-60.0								1.6-2.5			Rem.	140-320	340-520	40-15		90-160
CZ104	(CuZn20Pb)	None		79.0-81.0								0.1-1.0			Rem.	90-460	340-650	50-5		70-170
CZ130	CuZn43Pb2 and CuZn43Pb2Al	CW623N CW624N	Brasses for architectural sections	55.0-57.0 55.0-57.0	0.05-0.5						1.6-3.0 1.6-3.0			Rem. Rem.	160-200 160-200	370-430 370-430	35-25 35-25	90-120 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 gives an accentuated uniform improvement to natural oxidation effects.	
CZ136	CuZn40Mn1Pb1	CW720R		57.0-59.0			0.5-1.5	1.0-2.0						Rem.	125-200	340-500	40-30	80-115		
CZ114	CuZn40Mn1Pb1AlFeSn	CW721R	High tensile brasses	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				Rem.	230-340	430-590	30-20	110-175	The alloying additions produce improved mechanical properties. The lead in CW721R improves machinability. Used for fasteners, valve parts, etc. Silicon addition gives added wear resistance.	
CZ116	CuZn25Al5Fe2Mn2Pb	CW705R		65.0-68.0	4.0-5.0	0.5-3.0	0.5-3.0	0.2-0.8						Rem.	420-490	690-770	20-15	170-220		
CZ115	CuZn40Mn1Pb1FeSn	CW722R		56.5-58.5		0.2-1.2	0.8-1.8	0.8-1.6		0.2-1.0 Sn				Rem.	230-340	430-590	30-20	110-175		
CZ135	CuZn37Mn3Al2PbSi	CW713R	High tensile brass/wear-resistant	57.0-59.0	1.3-2.3		1.5-3.0	0.2-0.8	0.3-1.3					Rem.	230-340	500-700	20-12	150-200		
CZ132	CuZn36Pb2As	CW602N	Dezincification-resistant brass	61.0-63.0				1.7-2.8		0.02-0.15 As				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 (see CDA Information Sheet No. IS 36). The addition of arsenic to 70/30 brass improves resistance to corrosion.	
CZ105 and CZ126	CuZn30As	CW707R	Arsenical brass	69.0-71.0						0.02-0.06 As				Rem.	110-170	200-350	55-20	70-90		
CZ112	CuZn36Sn1Pb	CW712R	Naval brass	61.0-63.0				0.2-0.6		1.0-1.5 Sn				Rem.	125-185	340-430	40-20	100-160	The tin addition improves corrosion resistance, especially in sea water. The leaded version has improved machinability.	
CZ134	CuZn36Pb2Sn1	CW711R	Leaded naval brass	59.5-61.5				1.3-2.2		0.5-1.0 Sn				Rem.	125-170	340-400	40-20	100-150		
CZ133	CuZn39Sn1	CW719R	Naval brass (uninhibited)	59.0-61.0						0.5-1.0 Sn				Rem.	155-280	400-460	30-20	100-145		
CZ137 (superseded CZ123)	CuZn39Pb0.5	CW610N	60/40 brasses	59.0-60.5				0.2-0.8						Rem.	120-280	340-460	45-25	90-150	Will withstand limited amount of cold working and bending.	
CZ109	CuZn40	CW509L		59.5-61.5										Rem.	120-280	340-460	45-25	90-150		
CZ106	CuZn30	CW505L	Ductile brasses	69.0-71.0										Rem.	90-480	370-770	55-3	70-190	Can be deformed extensively by cold working.	
CZ107	CuZn36	CW507L		63.5-65.5										Rem.	90-480	370-770	55-3	70-190		
CZ103	CuZn20	CW503L		79.0-81.0										Rem.	90-460	340-650	50-5	70-170		

Notes:

(1) Properties:

The typical mechanical properties shown apply to rod for free machining and general purposes which can have significant cold drawing after extrusion. The values represent those typically required rather than the limits that are possible. Products such as hollows and profiles which are not normally significantly cold drawn will have the lower end of the range for proof stress, tensile strength and hardness and will have good elongation values.

Compositions:

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.

Standards:

This table includes materials previously included in BS 2874 'Specification for copper and copper alloy rods and sections (other than forging stock)'. These materials are now included in the following EN standards for individual product forms:

- 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 purposes'
- EN 12168 'Copper and copper alloys - Hollow rod for free machining purposes'