

Brass

Brass is primarily an alloy of copper and zinc to which additions of other elements such as tin, manganese, arsenic, aluminium, silicon and lead are often made. These additions are usually small (less than 5%) but enhance the individual properties of the alloy, resulting in a material that is ideal for specific application areas. The variety of compositions give specific benefits such as a good strength and ductility or an excellent corrosion resistance, high wear resistance, free machinability or a high conductivity. With a grade to suit every industrial sector, brass is regarded as one of the best starting points for designers during material selection when long and cost-effective service is required.



There are over 40 standard types of brass, from naval brass to high tensile brass and dezincification resistant brass (DZR brass) to free machining brass. The unique combination of properties available from brass means it is the most commonly used of all the copper based alloys. Columbia Metals stocks a wide range of brass in round bar, hexagon, tube, sheet and plate, all available for immediate delivery.

The zinc content of brass can vary from 5 - 40% dependent on the individual grade. Brasses with a higher copper content (above ~63%) can be extensively deformed at room temperature and are widely used for the manufacture of complex components by pressing, deep drawing, spinning and other cold forming processes. These grades are generally produced by extrusion, cold rolling and drawing. When the copper content falls

- **GOOD STRENGTH PROPERTIES**
- **ATTRACTIVE COLOURATION**
- **HIGH CORROSION RESISTANCE**
- **READILY MACHINABLE**
- **EASILY FORMED / FABRICATED**
- **READILY SOLDERED / BRAZED**
- **GOOD WEAR RESISTANCE**
- **HIGH CONDUCTIVITY VALUES**

below 63% and no other alloying elements are present, the ductility and cold formability are reduced, but these alloys can generally be readily hot worked by forging and stamping. These grades are usually manufactured using hot working, either by extrusion or rolling.

Generally brass has a very good resistance to corrosion, especially in normal atmospheric and fresh water conditions. Over time, outdoor exposure can cause a tarnish film to develop on the surface of brass. This results in the formation of the trademark green patina associated with copper and its alloys. The brass underneath remains unaffected and will not rust

away like iron or steel. Seawater and other more challenging atmospheres can also be handled successfully providing the correct alloy composition is selected. Alloying additions such as aluminium, arsenic, tin and nickel will all impart a better corrosion resistance, with grades such as dezincification resistant brass and naval brass being particularly successful for designing components that are in contact with fresh water or seawater.

Elements such as aluminium, nickel, iron and manganese can also be added to improve the strength and hardness levels of a brass. Zamalloy and high tensile brasses such as CZ114 and CZ115 are examples that have been developed for enhanced mechanical properties. These types of brass should be selected for more exacting strength and wear applications such as gas valves and fittings, pumps, fasteners and bearings.

All grades of brass are intrinsically easy to machine but the addition of lead further improves this property. CZ121 / CW614N has a 3% lead addition and is well known as the free-machining brass that sets the standard by which other materials are judged and rated. Brass can also be readily joined via brazing or soldering which, combined with the other forming attributes, gives machinists lower tool wear, higher speeds and lower overall fabrication costs.

Stocked sizes of brass

● Round Bar	5/32" – 5" dia
● Hexagon	0.193" – 1.7/8" A/F
■ Sheet / Plate	10g – 24g
■ Square	5/16" – 1.1/2" sq
— Flat and ● Tube also available	

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Brass



Grades and Properties

Designation And Common Terminology	Available Forms	Nominal Composition	Main Benefits
CZ101 / CW501L Gilding Metal		CuZn10	Excellent cold working properties and attractive rich golden colour. Primarily a sheet grade. Used for architectural / decorative applications.
CZ108 / CW508L Basis Brass		CuZn37	Very good hot and cold working capabilities. Ideal for spinning, deep drawing, thread rolling and bending. Also readily soldered.
CZ109 / CW509L Muntz Metal		CuZn40	A lead-free brass offering very good hot working and reasonable cold forming attributes. Can be hot headed and hot stamped with ease.
CZ110 / CW702R Aluminium Brass		CuZn20Al2As	Very good fresh water and sea water corrosion resistance, good strength levels and machining. Arsenic imparts a resistance to dezincification.
CZ112 / CW712R Naval Brass		CuZn36Sn	High corrosion resistance for marine hardware and other mildly aggressive environments. Good strength levels and excellent hot formability.
CZ114 / CW721R High Tensile Brass		CuZn40Mn1Pb-AlFeSn	Very high strength levels and a good corrosion resistance combined with a good machinability and hot stamping properties.
CZ115 / CW722R High Tensile Brass		CuZn40Mn1PbFeSn	A high strength, readily machinable alloy with a restricted Al content to aid brazing. A very good corrosion resistance but not as high as CZ114.
CZ120 / CW612N Engraving Brass		CuZn39Pb2	A leaded free-machining and engraving brass. Primarily a sheet grade, it offers a combination of good strength and high corrosion resistance.
CZ121 / CW614N Free Machining Brass		CuZn39Pb3	The classic free machining grade for high speed operations. Offers a machinability rating of 100% a good strength and good corrosion resistance.
CZ126 / CW707R Arsenical Brass		CuZn30As	A tube grade with an addition of arsenic that improves the corrosion resistance but retains its good strength, ductility and forming properties.
CZ131 / CW601N Riveting & Turning Brass		CuZn37Pb2	Reasonable cold forming properties and a good strength, ductility and corrosion resistance. The lead gives good wear resistance and machining.
CZ132 / CW602N DZR Brass		CuZn36Pb2As	High strength and ductility with a good corrosion resistance. Readily machined and formed and an excellent resistance to dezincification.
CZ137 / CW610N Leaded Muntz Metal		CuZn39Pb0.5	Offers very good hot working and limited cold forming. It is readily machined and offers good strength, ductility and corrosion resistance.
ZAMALLOY High Tensile Aluminium Brass		CuZn19Al6Mn5	Excellent strength and hardness levels and very good wear resistance. High corrosion resistance, readily machinable and good hot formability.