

Bronze CA104

Bronzes are copper-based alloys. Major alloying elements are often, but not always, zinc and tin. They offer a combination of properties such as high strength, hardness, corrosion resistance and wear resistance.

Copper-Aluminium alloys are commonly known as Aluminium Bronzes. These alloys cover a range of copper-based alloys in which the primary alloying element is up to 14% aluminium. The four major groups of Aluminium Bronze are:

- ◆ Single phase alloys containing less than 8% Aluminium.
- ◆ Two-phase or duplex alloys containing 8 to 11% Aluminium. These alloys also frequently have additions of Iron and Nickel to increase strength. This group contains casting alloys AB1 and AB2, the wrought alloys CA105, CA104 and Defence Standard (formerly *Naval Engineering Standard*) alloys (NES 747 when cast and the wrought form NES 833).
- ◆ The low magnetic permeability Aluminium Silicon alloys.
- ◆ The Copper Manganese Aluminium alloys with good castability.

Alloy CA104 is an Aluminium Bronze with high strength. CA104 also has excellent corrosion resistance, abrasion resistance and ability to withstand shock loading.

Applications

CA104 is typically used in:

- ◆ Valve and pump components
- ◆ Marine equipment
- ◆ Fasteners
- ◆ Engine components
- ◆ High temperature applications

Typical Chemical Composition

%	CA104
Cu	80
Pb	-
Sn	-
Fe	4.0-5.5
Al	8.5-11
Mn	0.5
Zn	-
Si	-
Ni	4.0-5.5

Typical Mechanical Properties

Grade	CA104
Tensile Strength (MPa)	750
Proof Stress 0.2% (MPa)	430
Elongation A5 (%)	15
Hardness VPN	210-300

Typical Physical Properties

Property	Value
Density	7.58 g/cm ³
Melting Point	1035°C
Modulus of Elasticity	115 GPa
Thermal Conductivity	37.7 W/m.K at 100°C


Alloy Designations

Brass alloy CA104 corresponds to the following designations:

CEN	BS	UNS
CW307G	CA104	C63200

Note that CW307G is not an exact equivalent.



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Corrosion Resistance

Corrosion resistance is considered to be excellent in most environments.

Cold Working

CA104 has only a fair rating for cold working.

Hot Working

The hot forgeability rating for CA104 is quite good at 70, compared to Forging Brass which is rated as 100.

The recommended hot working temperature for this alloy is between 815 and 900°C. The hot working capabilities of CA104 are considered to be good.

Heat Treatment

Solution treatment or annealing can be done by rapid cooling after heating to 620-800°C.

Machinability

Bronze alloy CA104 has a fairly poor machinability rating of 30 compared to Brass CZ121 / CW614N which is rated as 100.

Welding and Joining

- ◆ Gas shielded arc welding of CA104 is rated as "excellent"
- ◆ Coated metal arc welding, spot welding and butt welding are rated as "good"
- ◆ Soldering, brazing and seam welding are rated as "fair"
- ◆ Oxyacetylene welding is rated as "fair"

Supplied Form

CA104 is typically supplied in the following form:

- ◆ Round rod

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