Datasheet

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Aluminium Bronze

Specifications:

Commercial: **CA104**
EN: **CW307G**

Bronzes are copper-based alloys with the major alloying element being 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 (duplex) alloys containing 8-11% 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 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/CW307G is typically used in the following: valve and pump components, marine equipment, fasteners, engine components and high temperature applications.

Alloy designations

Bronze CW307G corresponds to the following designations but may not be a direct equivalent:
UNS C63200, CA104, CuAl10Ni5Fe4.

Supplied forms

CW307G/CA104 is typically supplied in the following: round bar, square bar, flat bar, sheet and plate.

Corrosion resistance

Corrosion resistance is considered to be excellent in most environments.

Cold working

CA104/CW307G has only a fair rating for cold working.

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Hot working

The hot forgeability rating for CA104/CW307G is quite good at 70, compared to Forging Brass which is rated at 100. The recommended hot working temperature for this alloy is between 815-900°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.

Machineability

Bronze alloy CA104/CW307G has a fairly poor machineability rating of 30 compared to Brass CZ121/CW614N which is rated to 100.

Weldability

Gas shielded arc welding of CA104/CW307G 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.

General physical properties	
Property	**Value**
Density	7.58g/cm^3
Melting point	1035°C
Modulus of elasticity	115 GPa
Thermal conductivity	37.7 W/m.K

Mechanical properties	
EN12163:2011 Rod & Bar 10-120mm A/F	
Property	**Value**
Proof stress	320-400 min MPa
Tensile strength	680-740 min MPa
Hardness Brinell	170-210 HB
Elongation A	8-10% min

Chemical composition	
EN12163:2011 CW307G	
Element	**% Present**
Aluminium (Al)	8.50-11.00
Nickel (Ni)	4.00-6.00
Iron (Fe)	3.00-5.00
Manganese (Mn)	0.0-1.00
Zinc (Zn)	0.0-0.40
Others (total)	0.0-0.20
Silicon (Si)	0.0-0.20
Tin (Sn)	0.0-0.10
Lead (Pb)	0.0-0.05
Copper (Cu)	balance

Mechanical properties may vary widely according to condition (soft/half hard etc)