FINAL
+ADVANCED MATERIALS

DATA SHEET
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7MG.019
Bronze

Summary

Physical variables included in this documentation are provided by way of indication only and do not, under any circumstances, constitute a contractual undertaking. Please contact our technical service if you require any additional information.

Final Advanced Materials Sàrl
4 avenue de Strasbourg
68350 Didenheim – France
Tel : +33 (0) 3 67 78 78 78

Final Advanced Materials GmbH
Basler Strasse 115
79115 Freiburg – Deutschland
Tel: + 49 (0) 761 47 87 336

www.final-materials.com

Overview

Bronze is a metal alloy consisting principally of copper, tin or aluminium, although other metals such as zinc, lead and nickel can also be added. Bronzes are characterised in general by their satisfactory mechanical properties, their wear resistance, their heat conduction and their electrical conductivity.

Special attention is required to machine bronze, which requires specific expertise and equipment.

Applications

- Metallurgical industry
- Field of art
- Manufacture of components for mechanical and electrical industries
- Hydraulic constructions
- Sea installations
- Construction of various installations, machines, vehicles

info@final-materials.com

Benefits (depending on grade)

- Good wear resistance
- Good electrical conductivity
- Average corrosion resistance

Machining capacities

Specific capacity limits:

Turning: Up to Ø90 mm and 600 mm in length
Loading of max. length 3,000 mm bar material

Milling: Up to a thickness of 200 mm (must be approved according to the plan)

Main characteristics

Property		Unit	Tin bronze			Aluminium bronze	
			UE7	UE9	UE12	CUAL9	CUAL10
Composition	Cu	Wt. in %	81.0 – 85.0	BAL	85.0 – 88.5	BAL	BAL
	Ni		≥ 2.0	≥ 0.3	≥ 2.0	0.2	4 - 6
	P		≥ 0.1	0.2 – 0.4	≥ 0.6	-	NC
	Pb		0.5 – 8.0	≥ 0.05	≥ 0.7	≥ 0.1	≤ 0.05
	Sn		6.0 – 8.0	7.5 – 8.5	11.0 – 13.0	-	≤ 0.1
	Zn		2.0 – 5.0	0.3	≥ 0.5	-	≤ 0.4
	Al		≥ 0.01	-	≥ 0.01	8 - 10	8.5 - 11
	Fe		≥ 0.2	≥ 0.1	≥ 0.2	≥ 0.1	3 - 5
	S		≥ 0.1	-	≥ 0.05	-	-
	Mn		-	-	≥ 0.2	0.7	≤ 1
	Sb		≥ 0.3	-	≥ 0.15	-	-
	Si		≥ 0.01	-	≥ 0.01	-	≤ 0.2
	Others		-	≥ 0.2	-	≥ 0.3	≤ 0.2
Specific heat		$J\ kg^{-1}.K^{-1}$	0.376	NC	0.376	4.18	NC
Thermal conductivity		$W.m^{-1}.K^{-1}$	59	59	46 – 54*	63	36
Electric conductivity		$m/\Omega.mm^2$	6.9	5	6.2	13	7
Elastic modulus		kN/mm^2	102	115	≥ 90	120	± 120
Density		kg/dm^3	8.80	8.80	8.8 – 8.6*	7.6	7.6
Coefficient of thermal expansion		10^{-6} /K	18	17	18.5	18	16
Maximum temperature of		°C	200	200	250	NC	NC
Yield point		Mpa	120	130	150	≥ 160	≥ 300
Tensile strength		N/mm^2	260	280	≥ 280	≥ 440	≥ 600
Flexural strength		N/mm^2	± 110	NC	± 90	NC	± 185
Elongation at break (A_5)		%	16	25	5 - 6*	≥ 15	≥ 8
Brinell hardness		HB	70	≥ 130	≥ 90	≥ 105	170

* The compositions may vary depending on the manufacturer.

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