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D4

Material designation	
CuAl9Ni3Fe2	
NF A 51-116	CuAl9Ni3Fe2
GAM MM 11	CuAl9Ni3Fe2
DIN 17665	CuAl9Ni3Fe2
EN 12165 (1998)	CW304G

Chemical composition*

Elements	% mean	Impurities	% max.
Fe	2.7	Pb	0.02
Ni	3.1	Sn	0.1
Mn	1.3	Si	0.1
Al	8.9	Zn	0.3
Cu	Balance	Others	0.1

* Reference values in % by weight

Properties and typical applications

Very good behavior under high load and high temperature conditions. Nuts, slides and bolts for machine tools, connectors…

Physical properties at 20°C	
Density (g/cm3)	7.7
Young modulus (GPa)	120
Thermal expansion coefficient (20-300°C) (10^{-6}/K)	17
Thermal conductivity (W/m.K)	50
Thermal capacity (J/Kg.K)	418
Electrical conductivity (% I.A.C.S.)	10

Heat treatment	
Melting range (°C)	1050-1075
Hot working (°C)	850-950
Annealing temperature (°C)*	650-750
Stress relieving treatment (°C)**	300-400

Annealing treatment of a material leads to reduce its hardness and increase its ductility.

****Stress relieving treatment allows to eliminate the residual stresses present in the material in ordrer to avoid the stress corrosion cracking.***

Forming	
Hot forming	Good
Cold forming	Not recommanded
Machinability	40% (CuZn39Pb3 = 100%)

Corrosion resistance

The bronzes of aluminum have a high corrosion resistance, in particular in the sea environments.

Joining	
Soldering	
Soft	Not recommanded
Hard	Fair
Welding	
Gaz welding	Not recommanded
Inert gas shielded arc welding	Good
Resistance welding	Good

Mechanical properties according to NF A 51-116

Condition of material	Diameter [mm] from	Diameter [mm] to	Rp0,2 [Mpa] min.	Rm [Mpa] min.	A(%) min.	Hardness HB
H31 (Drawn and heat treated)	6	25	280	640	15	165
	25	50	270	640	16	160
	50	80	250	620	16	155

Fabrication range

Available forms: 

Do not hesitate to contact us for further information regarding the dimensions, tolerances and metallurgical conditions.
Our technical teams are by your side to help you succeed in your projects.

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