

AMORPHOUS ALLOYS

AMLOY-CU01

MATERIAL PROPERTIES

- Extremely high strength with excellent elasticity
- High surface quality
- High hardness and low abrasion
- High wear and corrosion resistance
- Biocompatibility
- Isotropic behaviour

DESIGN GUIDE & APPLICATIONS

- Min. wall thickness: 100 µm
- Max. wall thickness: up to 2 mm
- Component weight: up to 15 g
- Cutting and edging in medical applications
- Small gears
- Mechanical components in the watch industry
- Micromechanics and precision components
- Abrasion-critical components

PROCESSING TECHNOLOGIES

The copper-based alloy is currently processed using precision die-casting, which enables the production of small, complex, and thin-walled components with excellent surface quality and tight tolerances. Due to its amorphous nature, the material exhibits lower shrinkage compared to crystalline alloys, enabling highly reproducible manufacturing of precision parts.

We are currently working on processing the alloy using additive manufacturing.

CHEMICAL COMPOSITION

Element	Concentration (wt%)
Cu	balance
Ti	27
Zr	16
Ni	8

PHYSICAL PROPERTIES

Properties	Typical Value
Density (g/cm ³)	6.89
Liquidus temperature (°C)	890
Solidus temperature (°C)	800
Glass transition temperature T _g (°C)	400
Crystallization temperature T _x (°C)	445
Crystallization enthalpy ΔH (J/g)	-122.6
Young's modulus (GPa)	105
Poisson's ratio	0.39
Bending yield strength (GPa)	2,4
Tensile yield strength (GPa)	2,0
Compressive yield strength (GPa)	2,1
Vickers hardness (HV5)	570
Electrical resistance (Ω mm ² m ⁻¹)	~ 1.6
Thermal conductivity (W K ⁻¹ m ⁻¹)	~ 10
Lin. coef. of expansion [µm K ⁻¹ m ⁻¹]	~ 10
Specific heat capacity (J kg ⁻¹ K ⁻¹)	390

