

# ARG-940MILL 940‰

READY-TO-USE 940‰ ARGENTIUM SILVER ALLOY FOR MECHANICAL WORKING IN DROPS

## GENERAL INFORMATION

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Typology	Ready to use silver
Color	Silver
Production process	Mechanical working
Grain refinement level	High
Deoxidation level	Low

### Commercial composition (%)

AG	94.7
CU	4.3
GE	1.0

### Melting Temperatures

Solidus [°C]	860
Liquidus [°C]	895
Melting range [°C]	35

## FULL CHARACTERIZATION DATA

### Color coordinates

L *	a*	b*	c*	Yellow Index
95.3	-0.3	3.9	4.0	7.2

### Mechanical characteristics

As cast hardness [HV 0.2]	65.0
Hardness after 70% area red. [HV 0.2]	170.0
Hardness after annealing [HV 0.2]	65.0
Double step age-hardening hardness [HV 0.2]	140.0
Single step age-hardening hardness [HV 0.2]	110.0
Tensile strength (Rm) [Mpa]	255.0
Yield strength (Rp0.2) [MPa]	101.0
Elongation at rupture (A) [%]	31.0

### Physical characteristics

Density [g/cm <sup>3</sup> ]	10.3
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### General characteristics

As cast grain size [μm]	200.0
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### Product applications

CNC and lathe production  
 Handmade production  
 Continuous casting  
 Sheet production  
 Wire production  
 Massive chain production  
 Laser welding  
 Hollow chain production  
 Cladding production  
 TIG tube production  
 Ingot casting  
 Stamping production

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## MECHANICAL WORKING PARAMETERS

### Pre-melting temperature

Temperature [°C]

### Reductions

Sheet - area or thickness (%)	70
Wire - diameter (%)	45

### POURING TEMPERATURES

Countinous from [°C]

Countinous to [°C]

Ingot to [°C]

Ingot from [°C]

Temperatures

1000

1080

980

1020

### MECHANICAL WORKING ANNEALING

Temp. from [°C]

Temp. to [°C]

Time [min]

&lt; 1 mm

560

620

20

1 - 5 mm

560

620

25

&gt; 5 mm

560

620

30

### Mechanical working quenching

Quench directly in water.

## AGE HARDENING PROCESSING PARAMETERS

### SINGLE STEP

Temperature [°C]

Time [min]

Quenching

**AGE HARDENING**

300

90

In air or in furnace

### DOUBLE STEP

Temperature [°C]

Time [min]

Quenching

**Age-hardening**

700

40

In water, immediate

**Age-hardening**

300

60

In air or in furnace

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**Pre-mixing**

For the production of semi-finished products from continuous casting (bar, wire, tube) where a plastic deformation is required, it is advisable to proceed with the pre-melting of the material. This will allow for a good grip between the starting bar and the alloy to be drawn. For lost wax casting process, the pre-melting is not required.

**Material re-usage**

The maximum amount of reused metal allowed is of 50% in weight. The material should be clean, deoxidized and without inclusions. It's anyway advisable to not exceed 30% re-used metal.

**Process temperatures**

Strictly respect process temperatures indicated in the technical chart. Preferably use melting systems that provide an easy measurement of the metal temperature.

**Flask temperatures and cooling times**

For lost wax casting processes, do not exceed flask temperature of 680°C. Use high-quality investment in order to decrease the reactivity between investment and alloy. Argentium alloys retain their heat for longer than standard Sterling silver - allowances for a slower cool must be made when quenching.

**Surface porosity**

An object free from porosity is less reactive towards tarnishing in comparison with a porous object, since it has no cavities that could collect dirt or atmospheric moisture and serve as trigger points for the reaction of tarnishing.

**Parts assemblies**

Mechanical assemblies of items constituted by the same alloy are to be preferred.

**Soldering**

Usage of solders specific for Argentium alloys should be preferred. Where applicable, techniques which ensure good repeatability of the process, such as laser welding with or without external material (always consisting of the same alloy) should be used.

**Age-hardening**

Follow the instructions given above in the section "Age hardening processing parameters".

**Finishing and cleaning**

Argentium alloys can be polished using traditional wheels or mass finishing processes. The use of separate polishing wheels for Argentium alloys is advised - this prevents cross-contamination of other alloys onto the surface of Argentium pieces, which can compromise tarnish resistance.

In order to maximize Argentium resistance to tarnish, the correct finishing procedure is composed of the following steps:

- Ultrasonic cleaning: use a two step cleaning, with ultrasonic soap such as ANDY GOLD. The first clean will eliminate the most part of the dirt from the pieces, followed by a rinse with tap water. Repeating the ultrasonic cleaning in a second tank with cleaner liquid will allow to eliminate any dirt residue and will prevent dragout of dirt on the pieces.
- Rinses: after ultrasonic cleaning is completed, do NOT use deionized water with Argentium silver; please use water with reduced hardness, obtained through softening systems that reduce content of limestone or other water hardening substances.

**Post treatments**

Surface treatments after finishing: to protect the products during storage, it is mandatory to carry out a passivation with the product T-PRO or with GA152AG, to passivate the surface. T-PRO and AG152AG (see the product documentation) create an invisible barrier on the surface of the workpiece which, although not resistant to wear stresses, allows to block the start of any kind of chemical reaction on the surface of the piece for the whole storage time, and to start the effective life time of the item with the first use by the final customer.