



# ARGENTIUM<sup>®</sup>

## THE FINEST SILVER

### *Argentium Silver - Quick Start Guide*

This document offers guidance on the best practice for working with Argentium Silver. The  symbol highlights helpful tips, important information and facts about Argentium Silver. Further information is available at [argentiumsilver.com](http://argentiumsilver.com), enquiries can be emailed to [info@argentiumsilver.com](mailto:info@argentiumsilver.com) and instruction video clips by Ronda Coryell can be viewed at [youtube.com/playlist?list=PL6EF75AEA8574308C](https://youtube.com/playlist?list=PL6EF75AEA8574308C) (Ronda's instruction DVDs are available to purchase online).

#### Annealing / Heating Applications

 **Facts:** Argentium Silver displays a paler colour glow than traditional Sterling silver at red-hot temperatures. Argentium Silver does not develop firestain when heated. Argentium will crack if it is touched, moved or quenched too quickly.

- It is advisable to carry out torch annealing and soldering procedures in a shaded area to prevent overheating.
- Make sure your Argentium Silver is securely supported whilst heating.
- Always wait until the red glow has disappeared from your Argentium Silver before touching, moving or quenching.
- Recommended furnace annealing temperature: 600-650°C/1112-1202°F for 25-40 minutes (dependent on the thickness of the material being annealed).
- When furnace annealing using a protective atmosphere, it is important that the furnace gas does not deplete the germanium oxide surface layer as this will diminish tarnish and firestain resistance. Use inert furnace atmospheres (i.e. nitrogen or argon), or an atmosphere containing maximum 5-10% hydrogen in nitrogen.

#### Quenching

 **Fact:** Argentium Silver retains its heat for longer than traditional Sterling silver and will crack if it is quenched too quickly.

- Always wait until the red glow has disappeared before quenching Argentium (this is best judged in a shaded area).
- Quench in water. (It is hazardous to quench metal in pickling solution.)

#### Pickling

 **Important tips:** Remember to dilute the pickle solution as advised by the supplier and heat to the recommended working temperature. Do **not** use pickle solution that is over-used. Do **not** use hydrofluoric acid with Argentium Silver.

Recommended pickling solutions are: sodium bisulphate, weak Sparex, phosphoric acid, sulphuric acid.

#### Hardening

 **Fact:** Argentium Silver can be formed into complex shapes in its fully soft condition then, by means of a simple heat treatment, have its hardness and durability increased.

**Heat hardening method 1:** After annealing or soldering Argentium Silver, allow the piece to air-cool to room temperature. Follow by heating in a furnace or oven at 300°C/572°F for 120 minutes and allow to air-cool to room temperature.

**Heat hardening method 2:** Using either a torch or furnace, anneal the Argentium Silver to a pale-red temperature (see recommended furnace annealing instructions under 'Annealing / Heating Applications' above), wait until the red glow has disappeared then quench in water. Follow by heating in a furnace or oven at 300°C/572°F for 120 minutes, then air-cool to room temperature.

#### Joining

 **Fact:** Argentium Silver can be soldered, fused and welded.

- A range of Argentium solders is available. Recommended fluxes are: Argentium Flux, My-T-Flux, Batterns Flux, Prips Flux, Auroflux. (NB. 'Handy' or 'Easy Flo' type fluxes can cause staining with Argentium Silver.)
- For soldering, it is only necessary to flux the seam to be soldered rather than applying flux to the whole piece.
- Fusing enables strong, clean joints with the added benefit of not having to remove excess solder or having visible solder seams on finished articles. It is recommended to apply a diluted flux to the sections being fused. Instruction video clips are available at: [youtube.com/playlist?list=PL6EF75AEA8574308C](https://youtube.com/playlist?list=PL6EF75AEA8574308C).

#### Casting

 **Important tip:** The 'Argentium 935 and 960 Pro' alloys have been specifically developed for all casting applications.

*Casting continued on page 2*

## Casting (continued) Instructions given for average sized pieces - melt size 150 grams - 1 Kg

Flask temperature: 650-675°C / 1202-1247°F

Metal temperature: 990-1010°C / 1814-1850°F

Melt under an inert atmosphere (nitrogen or argon).

**Crucibles:** Use separate crucibles to avoid contamination from other alloys - clay graphite or pure graphite crucibles are recommended (silicon carbide crucibles are **not** recommended).

**Temperature control:** Argentium Silver displays a paler colour glow than traditional Sterling silver when heated or molten - accurate temperature readings are important to prevent overheating.

**Flask temperature:** Please use recommended temperatures (above). Casting into a flask that is too cold can cause cracking.

**Protective gas cover:** Use an inert gas cover (i.e. argon or nitrogen). The cast flask should be held under inert gas protection for 1 minute before removing from the casting chamber. If a protective atmosphere is not available, flux can be used (boric acid is recommended). Skim any oxides off the surface before stirring.

**Flask removal from the casting chamber:** After pouring the metal, leave the flask in the casting machine for 2-3 minutes before removing.

**Wet investment removal (suitable for castings without stones):** After pouring the metal, remove the flask from the casting chamber within 2-3 minutes and leave it to stand for 20 minutes before quenching in water. Castings can then be hardened by heat treatment (see previous page). NB. Quenching too quickly will cause cracking.

**Dry investment removal (suitable for stone-in-place castings):** After pouring the metal, remove the flask from the casting chamber within 2-3 minutes and leave it to cool for a minimum time of 90 minutes before quenching in water. Remove investment residues by jet washing, followed by pickling, then rinse with water (do **not** use deionised water).

## Polishing

**Stage 1 - cutting operation:** To remove metal and smooth the surface of pieces. This can either be a mechanical operation using ceramic or plastic media (use in accordance with the media manufacturer's recommendations), or it can be a manual process involving the use of abrasive wheels and emery paper.

**Stage 2 - finishing operation:** To give pieces a deep lustrous surface finish. This can either be a mechanical operation using media such as crushed walnut shells (use in accordance with the media manufacturer's recommendations), or a manual process involving the use of polishing compounds and polishing mops.



**Important tip:** The use of separate polishing media and mops for Argentium Silver items is recommended - this prevents cross-contamination of another metal/ally onto the surface of Argentium pieces, which can diminish tarnish resistance.

## Degreasing and Rinsing

Argentium Silver should be cleaned in an ultrasonic bath at 50°C / 122°F for 2 minutes using a neutral (pH 7-9) aqueous soap solution. After degreasing, pieces should be rinsed with water at room temperature and dried (if using hot air this should ideally be below 70°C / 158°F).



**Important tip:** Do **not** use deionised/reverse osmosis water as this can damage the protective germanium oxide and reduce tarnish resistance.



**Important tip:** With all cleaning tanks it is important that the cleaning solution is not allowed to develop a surface layer of oil or grease, as cleaned pieces will be coated with unwanted deposits when they are withdrawn from the cleaning tank. If this occurs, the surface layer of oil or grease will discolour in air, giving the false impression of a tarnishing reaction.

## Surface Passivation - Heat Treatment



**Fact:** A protective, tarnish resistant, germanium oxide will develop naturally on the surface of Argentium Silver, however it is possible to assist the formation of this oxide layer by applying a simple heat treatment to finished pieces.

**Heat treatment process:** After pieces have received their final polishing and degreasing/cleaning operations, simply heat them in an oven in an air atmosphere at 100°C/212°F for 3 hours. Ensure that the oven and Argentium Silver finished items are thoroughly clean before heat treating.

## Long-Term Care

Argentium is low maintenance silver. Simply wipe away any dust or finger marks with a soft cloth or, for more intricate pieces, wash in warm soapy water, rinse and dry immediately. An occasional wipe with a clean silver polishing cloth will help to maintain Argentium Silver's beautiful shine and lustre (Argentium Silver Care Cloths are available).



**Important tip:** Please do **not** use 'dip' silver cleaners with Argentium Silver.