Cynthia Eid's Tips For Soldering Argentium® Silver

Just as one needs to make a mental adjustment about soldering tactics when switching between traditional sterling and gold or platinum, it is necessary to use a different approach when soldering Argentium Sterling.

SOLDER vs. FUSE

Since fusing melts the surface of the AS, and soldering occurs at lower temperatures without melting the surface, fusing is a higher risk process than soldering. I tend to fuse early in the process of making a piece. The more time and material I have invested, the more likely I am to choose to solder.

HEAT CONDUCTIVITY

The most important thing to remember with Argentium Silver is to forget about trying to heat the whole piece of metal at once, or trying to have all the solder flow at once. Argentium Silver does not conduct heat in the way of traditional sterling alloys and copper alloys---the heat tends to stay where the torch has been. If you have experience with soldering gold or pewter, you will find that they conduct the heat similarly.

EQUIPMENT

Solders Since AS does not transfer heat the way that traditional SS does, it is usually not as necessary to use a sequence of different solders, since the previous joint is not likely to re-flow. I tend to use AS medium/hard for most joints. For soldering on a post, though, I usually use AS Easy.

Soldering Boards/Blocks It is recommended that a separate soldering board be used for Argentium Sterling, to avoid contamination, which can affect the tarnish resistance. I like to use soldering boards that are highly heat reflective, such as Solderite. Firebricks and honeycomb blocks are also quite heat reflective, but their rough surface can be regrettable if you overheat.

If you like to use charcoal, then it is important to flux the entire surface. Since charcoal creates an oxygen-free atmosphere, it is possible to get firescale on AS if the surface is not protected by flux.

Fluxes Flux the seam only, unless you are using a charcoal block. It is undesirable to flux all the surfaces, since that prevents formation of germanium oxide. Yellow liquid fluxes, such as Rio Grande's My-T-Flux and Batterns, and Auflux work best for me. Paste fluxes can cause firescale on both AS and SS, so I do not recommend them. Gel flux behaves like paste flux, so people who are accustomed to paste flux tend to find gel flux most comfortable to use. Though gel flux can seem rather expensive, a small bottle lasts a long time, since only seams need to be fluxed.

PROCESS

Cleanliness

I find it helpful to clean both the metal and the solder. I like scotchbrite pads, but scrapers, pumice with water, and sandpaper also work. Being methodical and thoughtful lead to more success in soldering.

Application of Flux

Use a brush to flux the seam, then heat the flux *gently* to dry it to a white powder. If this does not create a white coating along the seam, dab more flux on the bare areas, and gently heat again. Don't let the brush be *too* wet, or it can liquefy all the dried flux. Ideally, the metal is hot enough that the flux dries immediately upon touching the metal. Very brief applications of heat alternating with dabs of flux works best. If the metal discolors, that indicates that you are overheating. Continue to alternate between applying flux and heat until the seam has a white coating.

Solder Placement

I prefer to use more large pieces of solder rather than many small pieces---less time placing them, and less time with clean up. I put the pallions of solder into a little dish with flux. I feel that the flux protects the surface-- If the solder oxidizes, that metal has a higher melting temperature. I usually put the solder on after the flux is dry. If the solder is put on immediately, the flux on the solder dries on contact with the metal.

Torch Heat

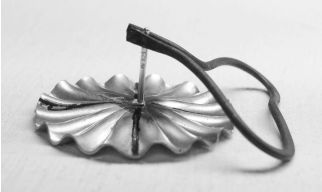
Though it is important to not try to "heat the whole thing" when working with AS, do remember that the metal melts the solder, so the objective is to get both pieces of metal to the same temperature. If one part is larger or thicker, put the torch on that part more. Use the condition of the flux on the two sides of the seam as a temperature guide. It may be helpful to put a few dabs of flux a half-inch or so away from the seam as additional indicators.

After a bit of overall heat, I start at one end and heat along the seam sequentially. Keep the torch moving in a back and forth or circular movement with the torch over a small area. When the solder flows in that area, move the torch flame to the adjacent area and heat until that flows, then move to the next area, etc. The first area takes the most time, and then each subsequent area takes less time. With a 1" diameter piece, I find that the solder flows as fast as I can turn the soldering turntable. A larger piece heats more slowly.

TIP: If the solder melts into a ball, that is an indication that the heat is being focused too much on the solder, and not enough on the metal around it.

Argentium Silver is Fragile when Red-Hot

If two pieces do not fit together well, they can be bound with binding wire, or pinned in place before soldering. Do not try to press two parts together during soldering, or move a piece into better position, as they will tend to break or crack. If tweezers hold too tightly onto a piece of AS, such as when soldering a post to an earring, the tweezers can flatten or break the AS. Adjust locking tweezers so that they hold firmly, without squeezing too tightly. When I taught in the Netherlands, a teacher from Schoonhoven showed me a good way to gently hold a part in place during soldering: he bent and forged a tool out of iron wire to hold the post. You can put the solder under the post, and gravity will let the post drop into place when the solder melts. I usually use 20 gauge/.8mm iron wire. For larger pieces, you may wish to use titanium wire or strips.



Solder Melt and Flow

Sometimes, solder does not melt completely, even though the solder has flowed along the seam. This is a phenomenon that can happen with any silver solder; the term for the partially melted pallion of solder is a "skeleton". This usually happens because the person is heating tentatively, resulting in the lowest temperature components of the solder flowing before the entire piece of solder flows. If this occurs, do not keep heating in hopes of having the entire piece of solder flow. Clean up the excess solder and heat with a larger flame and more boldness next time.

Quenching (and NOT quenching)

It is important to wait a few moments after finishing soldering before touching or moving the piece. It is okay to quench at "black heat", but quenching at red heat may result in cracking or breakage. In practice, it can be difficult to assess when black heat has been achieved. In my experience, it is okay if the water hisses and sizzles when the silver is quenched, but the piece was too hot if the water seems to boil or explode. As with all metals, I air-cool flat pieces completely because quenching warps flat metal. It is beneficial to cool flat pieces on a flat surface (I often slide my flat pieces onto a steel plate to cool).

Pickle Pickle and rinse to remove any oxides, just as you would any other metal after silver soldering.

Another Idea for Becoming Accustomed to Soldering Argentium Silver

It is not necessary to use AS solders with AS. It is possible to use traditional silver solder with AS to learn how to apply heat to this alloy that conducts heat differently. (Use Medium, and Easy solders. Hard melts at too high a temperature for beginners.) Then, when one has become more accustomed to how to apply the heat, one could start using AS solders, which don't tarnish as much as traditional silver solders, and have a whiter color. With this method of learning to adapt, only one thing at a time is being changed, making it easier to identify differences between the alloys and appropriate working methods.

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