



## E3 Duo™ Silver Etching Step-by-Step Instructions

For more information or to view instructions in color, visit [www.sherrihaab.com](http://www.sherrihaab.com)

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### How to Etch on .999 and Sterling Silver

The E3 Duo™ controller can be used to etch on silver in the same fashion as etching on copper and brass. The difference is that you need to use a different electrolyte solution instead of copper sulfate which is used for brass, bronze and copper. Silver nitrate and copper nitrate are two electrolytes you can use to electro-etch silver with.

#### Prepare your silver piece for etching

Follow the same steps as for preparing copper pieces for etching. You can etch on sheet metal or fired metal clay. Use an oil based paint pen to apply designs on beads or irregular surfaces. Heat set the paint with a rubberstamp embossing heat tool or hot hair dryer for best results. For perfect results on sheet silver try using our UV-30 film; this is by far the most durable and predictable resist we know of. If applied properly, it does not flake or wear off during etching.

With the exception of each end of the conductive wire, the mid section of the wire you attach to your piece **must** be coated with plastic or tape to avoid contaminating your solution thus stopping the etching process. Aluminum or copper wires will work as long as the portion that is exposed to the solution is covered. We sell plastic coated aluminum wires or you may cover your own wire with plastic or tape.

**\* IMPORTANT: USE COATED ALUMINUM OR COPPER WIRE, ALTERNATIVELY COVER WITH WATERPROOF TAPE TO SEAL THE EXPOSED PART OF THE WIRE WHILE IN SOLUTION (the metals will react with the solution and interfere with etching if not protected).**



Use the L1 or L2 power settings on the E3 Duo™ controller for etching silver, as silver etches 3-4 times faster than copper does. Follow our copper instructions for general etching steps.

#### Silver Nitrate

With electrical etching, Silver Nitrate is the best electrolyte for fine silver. Silver nitrate is mixed in distilled water as a 2% solution, which is similar in concentration to burn creams, or the antibiotic solution previously used in baby's eyes at birth.

Silver nitrate is a chemical compound available in powder form or in a pre-mixed solution. You will only need a small amount to etch with. After each use it can be filtered and re-used for future etching projects. Silver nitrate is light and air sensitive; so keep the mixed solution in a closed container in a dark cupboard. Use a dedicated stainless steel pan for silver nitrate.

A few words of caution: Airborne silver nitrate dust is harmful to breathe and grains can stain skin. A dust mask and rubber gloves should be worn while measuring dry powder. Mark the solution well as it is poisonous to ingest. Follow all of the safety guidelines, make sure to keep out of reach from children and pets. Visit the "SDS" link under "Learn" at [www.sherrihaab.com](http://www.sherrihaab.com) for safety information.

Silver nitrate can be used over and over for fine silver. With sterling silver, the solution eventually converts into a weak copper nitrate solution over time as the copper is extracted from the sterling. If the sterling is made with copper, the solution holds up fairly well with repeated etchings. However, sterling made with other metals can contaminate the solution and it will cease to etch. If you want to keep using the same batch, stick to fine silver. Silver nitrate does an excellent job of etching on silver metal clay as well. Strain the solution through a coffee filter after each use and reclaim the silver residue to use for other purposes.

As sterling etches you will see a small amount of dark residue form during the etching process. This is the copper extracted from the sterling. These small amounts of copper dissolve into the solution and over time you may notice the solution turning blue in color. After each etching session, filter the solution through a coffee filter and store in a marked bottle for storage. The solution can be used again, but in the event you need to dispose of it, you can flush it away by diluting with lots of water. Do not flush into septic systems however, as silver nitrate is an anti-microbial.

#### Mixing the silver nitrate solution (for fine silver or sterling with copper alloy)

To mix your own solution, add ½ liter of distilled water to 10 grams silver nitrate. Our silver nitrate kit comes with a bottle that is made with a plastic that will not react with silver nitrate, so it's easy to mix without having to touch the powder. You may also use

glass. Remember to wear gloves and follow safety precautions. The etching will take 30 minutes to 2 hours or more depending on how deep you want the finished relief pattern to be.

### **Copper Nitrate**

A suitable alternative to silver nitrate is copper nitrate. Copper nitrate works very well and is less expensive than silver nitrate. Copper nitrate is used for many applications including textile dyeing, printing, colorant for ceramics, wood preservative and as a fungicide or herbicide. Like other dry chemicals, protection for skin, eyes and respiratory system is needed when mixing the powder with water as well as other consideration for safety as directed by the manufacturer. Copper nitrate is a strong oxidizer and must not be used with or stored near combustible materials. It can be disposed of similarly to other electrolytes if flushed away with water. Note: Copper nitrate also works with Argentium Silver, although contamination will occur as the germanium and copper saturate the solution. Copper nitrate can be purchased from chemistry supply companies.

### **Mixing the copper nitrate solution (for any type of sterling silver or copper)**

Mix 1 oz. of copper nitrate with 12 ounces distilled water. Remember to wear gloves, dust mask and eye protection while mixing. As the piece etches you will notice quite a bit of residue forming as the piece etches and you may need to strain frequently between etching sessions. During the electrical etching process, copper nitrate causes the silver particles to form something that looks like "silver cotton" suspended under the piece. It floats between the piece and the pan which could interfere with etching. Simply use a plastic spoon or stick to remove the cotton-like obstruction and move it out of the way to clear the path for etching to occur. After etching, strain the solution through a coffee filter using a funnel. The cotton fluff is the silver which can be reserved. Strain and Store the solution in a marked bottle and treat as a hazardous chemical, keeping it away from children.

### **Finishing**

Rinse off the metal and etching wire under water, remembering to wear gloves. Finish the silver as desired.

**For more help, project ideas, and supplies, visit [www.sherrihaab.com](http://www.sherrihaab.com)**