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SHINING WAVE METALS

Skagit Argentium® Silver, Copper and Shibuichi Mokume Gane Billet Rod (103-515)

Technical Bulletin

Nominal Composition:

34% Argentium Silver (AS), 36% copper (Cu) and 30% Shibuichi by weight. The billet has 17 alternating layers of Argentium, copper and Shibuichi. There are 9 layers of Argentium, 5 layers of copper and 4 layers of Shibuichi arranged in the following order: copper–Argentium–Shibuichi–Argentium; this arrangement is repeated four times with one extra layer of copper as the last layer. The copper alloy layers are twice the thickness of the Argentium layers.

Description:

An un-patterned rod in Argentium, copper and Shibuichi. Stock size is .320” (8mm) square rod. Available in other sizes and sections by special order.

This product was developed to take advantage of the special properties of Argentium Silver (AS). Argentium does not form fire-scale and work hardens much more slowly than sterling, making it ideal for use in highly wrought items subject to multiple annealing cycles. The inclusion of the Shibuichi creates a different palate because it can be patinated to colors ranging from light grey to olive green to a dark greenish-brown.

Pattern:

Rod is a section used to make other patterns or as forging stock. Common methods used to introduce patterns are twisting, stock removal and distortion from forging.

Uses:

Jewelry, flatware and other decorative metalwork. Not recommended for continuous skin contact or on utensils that will have the patterned surface in contact with food or drink.

Melting Point:

Starts to melt at about 750°C (1,382°F).

Nominal Density:

5.00 troz/cuin or 9.5 gr/cc. Please note that the density and composition figures are for the billet with undeveloped pattern. The compositions will change due to metal loss from pattern development. These figures are for estimation purposes only.

Quality Mark:

No existing category in the current quality marking system.

Working the Material:

Do not hot work this material. Doing so will void the warranty.

This mokume is easily formed by raising, cold forming, die striking and sawing. Anneal after a 40% to 50% reduction has been achieved. Use a solder that flows at a temperature lower than the melting point. We recommend using Argentium solder. Regular easy and medium silver solder may also be used but will tarnish more quickly than the parent metal. Pressure or stress on this material while it is hot is not recommended as the Argentium is somewhat brittle when hot.

When developing a pattern, be sure to allow for stock loss. A good rule is that you will need to start with at least double the thickness of the final sheet or item.

Annealing:

The Argentium is highly reflective at the annealing temperature, so reading the color can be difficult. The color of the copper alloys is a more reliable indicator. The use of a flux indicator is recommended. To do this, brush a little flux on the surface and heat evenly until the flux melts. Remove the heat source and cool until the flux solidifies; then quench in water. The recommended annealing temperature is 620° C (1150°F). This material may be torch or kiln annealed. Protection from oxygen by annealing in a reducing atmosphere will reduce the amount of oxide formation on the copper but may stain the Argentium. Pickle as needed to remove oxides on the copper or stains on the Argentium, taking care not to leave in the pickle too long to prevent unwanted etching. White vinegar can be used as the pickling solution, though it might work somewhat more slowly.

Over annealing in frequency, time and temperature is not recommended. Over annealing can cause excessive grain growth and significantly weaken the metal, though the Argentium is less prone to this than sterling silver.

Finishing:

This mokume can be finished using standard jewelry finishing techniques. Heavy buffing is not recommended, as this may smear the surface of the metal and muddy the pattern. Use abrasives and tools that cut rather than grind. If a rotary file tool is used, it is often best to remove the tool marks with abrasive paper or water stones before buffing.

A matte or finely textured surface will best show off the colors of the metals in the mokume. Sandblasting or glass beading can produce interesting results; experimentation with surface finish is recommended before determining a final form.

Etching:

Etching can be done with nitric acid, ferric chloride, ammonia, vinegar (overnight) or by reverse plating.

Special note: Shibuichi will often form a film of silver on the surface from pickling and etching. To obtain darker oxidation colors using Baldwin's Patina or Rokusho, this film must be carefully removed in such a way as to not remove the topography created by the etching. Gently rub with fine steel wool, sharp pumice powder and/or the finer grits of 3M radial bristle disks. Re-polishing the surface after removing the silver skin may be done by light buffing or use of finer bristle disks.

Patina:

The copper will readily patina from handling. This mokume may be patinated with Baldwin's Patina, Rokusho and some commercial coloring products. Experimentation is recommended, keeping in mind that patinas may change with use and over time.

Note: Be sure to take proper safety precautions when using any chemicals or tools. This information represents the best knowledge and experience regarding the use of Shining Wave Metals products by their manufacturer, however it is not guaranteed to produce an expected result and is no substitute for experimentation by the user of Shining Wave Metals products.