



## **Data Sheet**

# Mokume-gane Haida

Sterling • Copper • 5% Shibuichi • 15% Shibuichi



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# Haida

STERLING • COPPER • 5% SHIBUICHI • 15% SHIBUICHI

## Sheet:

**Composition:** 31 layers of alternating Copper, Sterling, 5% Shibuichi and 15% Shibuichi, with no backing. Approximately 29.75% sterling, 26% copper, 21.5% 5% Shibuichi and 22.75% 15% Shibuichi by weight. The copper alloy layers are 2.5 times as thick as the sterling layers.

**Description:** A double sided pattern with a rich dark color when patinated. Sheet is fairly stiff and requires significantly more force to forge and form the metal. 24ga (.5mm) and 18ga (1mm) are stock sizes.

**Uses:** Jewelry, flatware and other decorative metalwork. Not recommended for continuous skin contact jewelry, such as bridal rings, or on utensils that will have the copper and shibuichi surface in contact with food or drink.

**Melting Point:** Starts to melt at the silver/copper eutectic temperature, 1435°F (779.4°C).

**Nominal Density:** 5 troy/oz 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. Easy and medium silver solder are recommended.

**Annealing:** When using a torch as a heat source, anneal to a dark red under dim light. Air cool after annealing, quenching is not recommended. If using a kiln, the set temperature should be between 1150°F-1200°F (620°C-648°C). The kiln interior should be flooded with CO<sub>2</sub> or an inert gas to prevent excessive scaling of the copper alloys. Pickle afterwards to remove the oxidation from heating using standard jewelry pickling compounds or white vinegar. Be careful not to leave in the pickle too long to prevent unwanted etching of the surface. Heating and pickling will build up a silver rich surface on the 5% and 15% Shibuichi and this should be removed prior to patination.

Over-annealing in frequency, time and temperature is not recommended. Over annealing can cause excessive grain growth and significantly weaken the metal.

**Finishing:** This mokume may 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 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:** May be done with nitric acid, Multi-Etch®, ammonia, vinegar (overnight) or by reverse plating. Etching is likely to form a silver rich surface on the 5% and 15% Shibuichi and this can interfere with patination. The silver-rich surface may be removed using abrasive bristle brushes, pumice with soap and water or No Name Patina Prep available through Reactive Metals Studio.

**Patina:** Using Baldwin's Patina will turn the copper to a reddish brown, like a well circulated penny, 5% Shibuichi will color to a dark brown-black and 15% to a variety of colors from an olive green to a medium grey. The sterling will remain white. Baldwin's Patina works best when metal is about 100°F (37°C). Rokusho may also be used.

Experimentation is recommended, keeping in mind that all patinas may change with use.

**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.