

♥ ALL ABOUT METALS ♥

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JEWELRY METALS	FUSE	HIGH-TEMP SOLDER	TARNISHES EASILY	SOFT/HARD TO STAMP
Fine Silver	√	√		S
Argentium Sterling	√	√		M
Sterling		√	√	S
Silver Filled		w/caution	√	M
Gold Filled		√	√ (light tarnish)	M
All Karats & Colors of Gold	√ (if pure)	√		S
Copper		√	√	S
Brass		√	√	M
Nickel		√	√	M+
Plated Metals				M
White Metals / Pewter				S
Aluminum				S
Stainless Steel		√		H*

S = soft - great for stamping

M = medium - also good for stamping but you will have to strike a bit harder

H = hard - will be tough to stamp on, but using a 2lb hammer will help

* = requires stamps rated for use on Stainless Steel

WHAT KINDS OF METALS ARE USED FOR JEWELRY?

You can use just about anything to make jewelry, though there are some traditional metals that are used for most jewelry. These metals can be divided into a few groups: precious, base, filled, reactive, and white. Precious metals include fine silver, sterling, all the karats and colors of gold, platinum, and palladium. Base metals are copper, brass, bronze, and nickel. Filled metals are made by bonding two separate metals together in layers, like gold over copper or brass, to help reduce the cost. Reactive metals include space-age metals like titanium, niobium, and aluminum. White metals, like tin, pewter, and antimony, have low melting points.

WHAT IS THE DIFFERENCE BETWEEN A PURE METAL AND AN ALLOY?

Alloys are a mix of two or more pure metals. Pure metals are mined from the earth and then refined, and include silver, gold, and copper. Pure metals are called fine, .999 or, in the case of gold, 24 karat. Alloys are used to make new metals with different colors and working properties. For example, sterling is an alloy of 925 parts fine silver and 75 parts copper. The copper makes soft pure silver more durable to wear, but it also makes it tarnish.

FINE SILVER

Fine silver is pure silver. It is very soft and malleable. Often you will see an artist hallmark his/her fine silver work with a .999 stamp. Fine silver remains fairly tarnish free (only tarnishes in extreme conditions) and stays clean when heated with a torch. Fine silver can be soldered and fuses easily.

STERLING SILVER

Sterling is an alloy of 92.5% fine silver and 7.5% copper. The copper makes sterling harder, but it is still very malleable for making rings, etc. Because of the copper content, sterling will tarnish to a dull gray and will blacken with firescale when heated with a torch. Sterling can be soldered, but it will not fuse.

ARGENTIUM SILVER

Argentium is an alloy of 93% fine silver and 7% germanium. The lack of copper means that Argentium is tarnish- and firescale-resistant, making it faster and easier to work with than sterling. It fuses like fine silver and solders like sterling, but with less flux. It is more malleable than sterling, but harder than fine silver. Note that it is weak when red hot, and can break or slump.

GOLD

In the West, gold is generally not used for jewelry when it is pure, soft, 24 karat. It is used in different combinations of karats and colors, which make it more durable and affordable, and also changes the color of the gold. Karat refers to the amount of gold in the alloy: 24 karat is pure, 18 karat is 75%, 14 karat is 58%, etc. Lowering the karat of the gold lowers its cost. The rest of the alloy is a mixture of metals -- often copper, silver and nickel -- which are used to change the color. For example, lots of copper makes rose gold, more silver makes white gold, more nickel makes green gold. Gold is malleable and durable, making it a wonderful metal for jewelry. Gold can be soldered, but requires its own solders to match color and karat.

COPPER

Copper is a pure metal and is very malleable. It tarnishes easily to a dark leather brown. It makes a great substitute for sterling when you're trying to figure out a new design or technique. Copper is a sticky metal, so it clogs files, saws and sandpaper quickly. Copper scales when heated with a torch, resulting in beautiful shades of red. Since it scales so easily, care must be taken to keep it clean for soldering.

BRASS

Brass is an alloy of copper and zinc. Brass is harder than copper, and this makes stamping and texture more crisp on brass than copper. It work-hardens faster than copper, and requires more annealing. When pickled after soldering or annealing, the copper will come to the surface and turn the metal a coppery pink. This can be removed with polishing or by adding hydrogen peroxide to your pickle solution. Brass tarnishes to a greenish gold. Brass with a higher copper content is called red brass because of its more coppery hue.

BRONZE

Bronze is an alloy of copper and tin, making it a more rich, golden color than brass. It is harder to find bronze as sheet and wire, but it is commonly used for casting. It can be harder and more brittle than brass, but otherwise works in a similar way to brass.

NICKEL SILVER

Nickel silver is an alloy of copper, zinc and nickel, and is also known as German silver. Nickel is a hard metal that work-hardens quickly, making it a bad choice for prongs and bezel settings. It is an inexpensive substitute for silver. It is slightly darker than silver and is less dense, so a similar amount of silver weighs more. Like

copper, brass, and bronze, you can use sterling solder and similar fluxes to fabricate with nickel silver. Some people are sensitive to nickel and it can cause skin reactions, like itching.

FILLED METALS

Filled metals are made of two metals bonded together -- usually a precious metal to a base metal -- to help make the price more economical for fabrication. Silver-filled is sterling or fine silver over brass or copper. Gold-filled is 12 or 14 karat gold bonded to brass or a similar base metal. The advantage of filled metal over plated metal is that the layer of precious metal is thicker than plating, allowing for fabrication like soldering and some polishing.

1/10 or 1/20

Filled metals are sold and marked by their weight of precious metal. 1/10th is 10% and 1/20th is 5%. Gold-filled is sold by its karat and the weight of that karat. For example, 12KY/20 gold-filled wire is 5% 12 karat yellow gold by weight. That means there is a tube of 12 karat yellow gold around a core of brass. 14KY/20 is the same as 12KY/20, but the gold is 14 karat. Rose gold filled is also available. Filled metals should always be hallmarked appropriately. It is not ethical to mark 14KY/20 as 14KY. Instead it should be marked 14K/20, or 14KY/20 GF, or 14K GF, or GF (gold filled).

Single-clad or Double-clad

Filled sheet metal can be single-sided or double-sided. For example, single-clad silver filled sheet has a sterling side bonded to a brass or copper base. Double-clad has a layer of precious metal on both sides of a base metal sheet. Double-clad is more expensive, but it looks like gold, for example, on both sides. Of course, the edges expose the brass core and will need to be covered if you want to hide that. Filled findings are available, like bezels and bezel wire, and will often be double-clad to hide any base metal cores.

PLATED METALS

Silver and gold plated metals, like copper-core and artistic wires, are electrically plated with a thin layer of another metal. Plated metals are vulnerable to most fabrication and come off easily during abrasive polishing, filing, engraving, sawing and soldering, revealing the base metal interior. Even the gold layer over silver found in vermeil can disappear at the high temperatures of soldering! In order to work with these metals, a plating machine is required to repair any damage with a new coat of metal.

WHITE METALS

White metals are alloys that have comparatively low melting points. Examples of white metals include pewter, Britannia, tin, and antimony. Today, most of these alloys no longer contain lead, for health reasons. White metals should not be mixed with precious or base metals because their lower melting points contaminate them. Even sharing tools like a file or sandpaper with gold or silver would spread the white metal and prevent them from being able to be soldered or annealed without making a big mess. White metals have their own solders adapted to their comparatively soft nature and lower melting points.

REACTIVE METALS

The reactive metals are associated with modern, space-age materials and include titanium, niobium, and aluminum. Aluminum has been in use since the 1800s, but titanium and niobium weren't used as commercial metals until the early 20th century. They are very durable and hard, and resist corrosion. Titanium and niobium are very hypoallergenic, so they make excellent ear wires for people sensitive to other metals. Beautiful colors can be rendered on their surfaces through a process called anodization, which requires a rectifier to produce an electrical current. Aluminum, when anodized, becomes open to receiving dyes. Reactive metals have a very different nature from the other non-ferrous metals, and are usually welded rather than soldered. Cold connections like riveting are typically used to combine reactive metals with gold, sterling, and other metals.

STEEL

Steel jewelry and combinations of steel and gold or silver jewelry is beautiful. Generally, working with steel comes under the specialty of blacksmithing, but when you scale it down to jewelry, we can use many of the same techniques to fabricate or solder as you would with copper or sterling.

It is important to understand the difference between iron, mild steel, steel, and stainless steel. Iron is the base component in steel, and is softer than steel. If cast, it can be so porous that soldering is difficult. Iron can be used to make jewelry, but the more common alloy available is mild steel, which has a small amount of carbon added to it. Mild steel is soft enough to fabricate with jewelry tools like saws, files, etc. Steel is an alloy of iron and more carbon, and comes in different levels of hardness. Steel is harder than mild steel and is used to make tools. It can be hardened and tempered to make it very durable. Stainless steel is a stain resistant alloy of steel, and because of that resistance can be a little more difficult to solder and fabricate. Iron, mild steel, steel, and stainless can be formed while red hot, when they are the softest and easiest to work. All of these ferrous alloys work harden quickly. When annealing iron and steel, heat it to red hot and then bury it in sand or pumice to cool slowly. Don't quench it. However, stainless is tougher to anneal without creating tough oxides, and has to be quenched after heating it to around 2000°F (1093°C).

When it comes to making jewelry with ferrous metals, mild steel would be my recommendation. Plus, steel is very inexpensive, durable, and lighter than non-ferrous metals. Soldering steel is different enough from non-ferrous metals to be challenging at first, but with a little practice, you can add the unique color and durability of steel to your jewelry.

Stamping blanks are widely available in stainless steel. This metal will be quite hard and you should only use stamps that are specifically made for stamping on stainless steel.