

Precious Metal Verifier – Frequently Asked Questions

How does it work?

The Verifier works by measuring the resistivity of the metal. Resistivity of different metals is very different and easy to distinguish. Even small differences in alloying—for example crown gold (91.67% gold balance copper) and 90% gold (90%gold balance copper) are different. More information on [Wikipedia](#).

Can the wrong metal or alloy give an answer that looks right?

It is almost impossible to duplicate another coin's resistivity, weight, and size. For example, silver is the most conductive metal known, so it is virtually impossible to duplicate. Gold is the third most conductive metal (only copper is between them). Platinum and Palladium have almost identical conductivities but are easy to distinguish in other ways.

In principle it would be possible for an alloy to be developed that would mimic, for example, American Eagle gold. But combined with the appearance and weight of the coin, the fake would be obvious. A coin that has about the right weight (for example using tungsten to fake gold) would have a totally different resistivity than gold.

There are known cases where common alloys can mimic the resistivity of precious metal alloys (It is possible there are other cases):

- 1) Johnson sandwich coins (modern US coins) have similar reading to gold.
- 2) Copper has similar reading to Britannia silver (95.8 % silver).
- 3) Tellurium copper has similar readings to 90% silver.

Note that silver plated copper does not read the same as silver, it is a little to the right (1 or 2 squares typically). Since many medallions are made this way, the user should be aware of this, and usually not accept items that read this way, if there is any suspicion about them, or if there is no ready explanation for the odd reading.

In order to make a bogus coin appear correct and have a correct reading would be a significant undertaking, but not in principle impossible. So readings that are correct have to be taken as useful information, and not necessarily a guarantee of validity.

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Can the right metal or alloy give an answer that looks wrong?

The results of the Verifier measurement are affected by the coin temperature, the coin stamping relief, and by the coin alloy. Temperature is compensated for in the instrument and is a fairly small effect, so except under very unusual circumstances will not be a factor. Only when the sample has been left in a hot car or out in the cold will it typically come into play. Generally, a hot coin (hotter than the instrument) will read to the right a little bit, and a cold sample will read a bit to the left.

Coin stamping relief is easy to see on the coin. The instrument already assumes a typical stamping relief and the effect is typically small. However, some medallions and molded coins have extreme relief and will read a little bit to the right. This is not typically seen in conventional coins because the relief is too small. On bars, areas that have heavy embossing or bubbles and flaws will sometimes read slightly to the right. Usually reading the opposite side or in another location will remedy this effect.

Some coins have variations in their alloys. In gold coins that have only 2 components (like crown gold with copper and gold) the alloys are exact because it affects the gold content. There is a little variation in American eagle gold, because the silver/copper ratio varies slightly; however, eagles will never read outside the target area.

Small amounts of iron in pure gold can produce significant reading changes. Gold that is at least .9995 pure has standards that limit the amount of iron content.

Some of the older gold Panda coins have slight impurities that can make them read 2-3 blocks to the right of the acceptable range.

In silver coins, additives can change the reading significantly. Below 90% silver, additives are common, even in modern coins (80%, 72% and 50% coins for example). However, it is less likely that these coins would be faked because of their low value. A wider range is used in the instrument for these coins based on our measurements, but the user should be aware that the variations can be significant.

Older coins (made, prior to 1935 or so) had many odd additives that were caused by poor purification techniques, or additives to make coin manufacture easier. Some known important cases are:

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- 1) US Morgans: some read as 90% silver and some don't, even from the same year and mint. Some mints are very good (Carson City) and some are quite variable (San Francisco). Generally older ones are more variable. Lead seems to have been a key contaminant that produced this variability.
- 2) US peace dollars appear to be better than the Morgan dollars as 90% silver, but still exhibit greater variation than US coins made after 1960.
- 3) Mexican silver is quite variable, especially 50% and 72% coins. Sterling Mexican coins seem OK to have accurate purity post 1935.

For old numismatic coins, variability will be high, and no data base has been developed for analyzing them. For specific valuable coins, the reading could be used as a signature, but this information is unknown at this time. Some items are slightly less than .999 pure and will read one to two spaces outside the expected range for pure gold. In these cases you should carefully check the dimensions and weight of the coin or bar.

How and when is the unit calibrated?

The unit is calibrated whenever the metal is changed, when the unit is turned on, if the sensor is changed, or on command by the user. To calibrate the unit press the RUN/CAL button when in run mode. It takes about 1 second.

Usually calibration is unnecessary. However, if odd readings are obtained (typically coins that are thought to be good are reading out of range), one thing the user should do is re-calibrate to make sure the instrument is giving correct readings.

NOTE: remove the sample to calibrate!

Can the Precious Metal Verifier be used with jewelry?

The Precious Metal Verifier does not work well with jewelry for two reasons. First, we need to know the specific alloy we are measuring and then determine if the item being tested falls into the range of that alloy. Jewelry alloys vary considerably. What is specified as 14K gold might be that, but it might just as well be 13K gold, and then the remaining metal might all be copper, but it might just as well be some silver and some copper, or some other combination. Each different combination would have its own range. The number of variations is too great for us to work with. The second problem is that we need a flat area of metal that can be completely covered by the sensor. Jewelry is often curved, woven, and/or

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ornate in a fashion that makes it so we cannot get an accurate reading on it. Also, necklaces, rings, and earrings are usually too small for even our small sensor to get an accurate reading. We have some success looking at sterling silver flatware and it often matches up with the sterling silver range on the Verifier; but there are also pieces that we just cannot measure.

Is the Precious Metal Verifier safe to use?

Yes, the Precious Metal Verifier uses very low power, low energy signals; and is no more dangerous than sitting next to an AM radio.

What should be done if the reading is unexpectedly right or wrong?

- 1) Remove the sample and re-calibrate.
- 2) Make sure the correct alloy is selected.
- 3) Try measuring another place on the sample or on the opposite side.
- 4) Compare to an unrelated sample of the same alloy.
- 5) Make sure the sample is not too hot or cold.
- 6) Make allowance for old coins (prior to ca. 1935).
- 7) A calibration disc is supplied with the unit. If you think the Verifier isn't working right, move to the calibration range by pressing the down arrow until the word 'calibration' appears in the display. Press the run/cal button and then measure the calibration disc. If this reading is out of range then something is seriously wrong with the device, so you should contact us (info@sigmametalytics.com), and we will work with you to ensure that the correct process is being used, and if necessary arrange to repair your unit.

How long does it take to measure?

Less than 1 second.

Can new types of metals be added?

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Yes, with the PC program you can add new types of samples, name them, and download them into the Verifier for use. Contact us at info@sigmametalytics.com and we will assist you with this process.

What kind of battery does the Precious Metal Verifier have?

Lithium-Ion. The battery is recharged with the supplied USB charger, your computer, or any USB phone charger. The battery lasts about 15 hours of run time. No need to change the battery.

Does the Precious Metal Verifier connect to a computer?

Yes, it will charge from the computer. Also, the unit will charge if plugged into a USB port.

Does it need maintenance or consumables?

No. It does calibration internally, and has nothing that is consumed.

Can it read through numismatic cases, plastic bags, etc?

Yes. There is a limit to how far away the sample can be, but for most coins in cases it will read them. For the smaller wands, the range is less. So for example 1/10 oz coins in numismatic cases are too small to read.

What are the optional wands for? How deep can they detect false metals under the surface?

The small wands are for reading very thin and small samples, for example 1/10 oz coins, 1 gram bars, and CombiBars. Some slabs have high walls which make it difficult for the main sensor to reach far enough to get a reading. The large wand can sit on the flat part of the slab and often measure coins that the main sensor cannot. Also, accurate measurement requires that the coin must completely cover the sensor, the large wand is therefore needed to measure most 1/4 oz and 1/2 oz coins. The large wand is also useful for rapidly reading coins in albums or cases without removing the coins.

Our new Bullion wand can measure deeper into the surface of precious metal bars in order to detect counterfeit metals underneath. The Bullion wand can detect tungsten up to 1.5 mm under a cladding of gold. The main sensor and all of the wands will penetrate a little over twice as deep into 22 K gold, 90% gold, platinum and palladium as compared to pure gold, silver, and silver alloys. The higher the resistivity of the metal, the deeper the signal penetrates.

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Can I use the Bullion wand on a basic unit that came without one?

Yes, but we will need to re-calibrate your unit and in some cases make slight hardware modifications to make the unit work with the Bullion wand. So, if you order a standalone Bullion wand, we will contact you and arrange for a quick turnaround as we match your unit to the new Bullion wand.