PMV Original FAQs Index

1. **How does the Precious Metal Verifier work?**

The Verifier works by measuring the resistivity – also known as the conductivity – of the metal. A metal's characteristic resistance can be quite different from other metals and therefore easy to distinguish by the PMV. Even small differences in alloying, such as crown gold (91.67% gold, balance copper) and 90% gold (90% gold, balance copper) have measurably different characteristic resistances. For more information on resistivity please read the Wikipedia article on resistivity here.

The Precious Metal Verifier makes a measurement is less than one second.

2. **Can the Precious Metal Verifier be used with jewelry?**

The Precious Metal Verifier does not provide accurate or reliable readings with jewelry.

Jewelry is difficult for the PMV to measure for two reasons. First, jewelry alloys vary considerably. The Precious Metal Verifier works by determining if the sample's characteristic resistivity matches that of the expected metal type selected by the user, which would be nearly impossible for the PMV. For example, what is specified as 14k gold might be a mixture of gold and copper, or it might be gold, silver, and copper, or it might be some other combination. Each mixture and alloy combination would need its own resistivity range, and the number of variations is too great for us to work with.

Second, the Precious Metal Verifier requires a flat surface on the sample to take a measurement, as well as a certain thickness and consistency throughout the sample. Jewelry is often curved, woven, and/or designed in an ornate fashion, making it difficult for the PMV to take an accurate reading. Furthermore, necklaces, rings, and earrings are often too small or thin for even our smallest sensor to make an accurate reading. Some customers have had success measuring sterling silver flatware, but the results depend on the sample being measured.

3. **Can the Precious Metal Verifier read through plastic bags, cases, and slabs?**

The Precious Metal Verifier can read through plastic bags, cases, and slabs. Plastic is invisible to the PMV's sensor; plastic has no effect on the reading.

The distance between the sample and the sensor does influence the measurement, however. If the sample is too far away from the sensor, the reading will be affected or impossible to make. The Precious Metal Verifier cannot read samples with very thick plastic spacers or cases in which the sample is too far from the sensor.

4. **Can the wrong metal provide a reading that appears good?**

Yes, the Precious Metal Verifier measures the characteristic resistance of the sample and compares it to the expected resistivity for the selected metal type. If the sample's resistivity is consistent with the expected metal's resistivity, then the PMV will read the sample as good. The Precious Metal Verifier is not a metal identifier: the PMV determines if the sub-surface electrical resistivity of the sample is consistent with the expected metal.

With any sample, the Precious Metal Verifier should be just one way in which the user verifies the authenticity of the piece. Ensure the sample has the correct weight and dimensions in addition to checking its resistivity with the PMV.

Below are some instances in which the sample is not the expected metal, yet the resistivity is within the expected range.

Gold:

Some brass allows have the same characteristic resistivity of gold and can be plated to appear genuine. However, brass has half the density of gold, so gold-plated brass coins and bars are either underweight or larger than expected. Test your sample to ensure it is the correct size and weight before taking a reading with the PMV.

Samples made of 80% silver with 20% copper will also have a characteristic resistivity similar to gold. These samples will be less dense than gold, so the sample will have an incorrect size or weight.

Other metals which match the density of gold have significantly different characteristic resistivity. For example, some counterfeiters use gold-plated tungsten to make imitation gold coins. While the weight and size of these counterfeits match with genuine gold pieces, the Precious Metal Verifier detects the tungsten's much different resistivity under the surface and reads the sample as being inconsistent with gold.

Silver:

The Precious Metal Verifier can read pure copper as consistent with silver. This is because the reading for pure copper and slightly impure silver (.999) overlap. To differentiate between silver-plated copper samples and genuine silver, first test the sample on the .9999 silver range. If the sample falls within that range, it is most likely not copper. If the sample is outside of that range, check the weight and dimensions of the sample to ensure the sample is the size it should be in published specifications. Copper is less dense than silver, so a silver-plated copper sample will be either be underweight or the incorrect size.

Some counterfeiters will try to counteract the orange discoloration of silver-plated copper by placing a nickel barrier between the copper and silver; this will cause the Precious Metal Verifier to read the sample as outside of the expected range on the .999 silver scale.

Modern U.S. coins can also cause issues. Modern copper-nickel clad coins were purposely designed to have the same characteristic resistance as 90% silver, 10% copper coins, and will read the same on the Precious Metal Verifier. The two coin types have different weights and can be distinguished by measuring them on a scale. The Small Wand attachment for the PMV Pro and PMV Original can also help distinguish between coin types because it takes readings very near the surface and can read the differences in metal content of the coins.

Platinum and Palladium:

Platinum and palladium have identical resistivity readings at room temperature, which means the Precious Metal Verifier cannot tell the difference between the two metal types. However, platinum and

palladium have quite different densities; samples can be distinguished by making sure the sample's size and weight matches the expected values for the coin or bar.

Plastic Cases & Slabs:

Some counterfeiters use plastic cases or slabs to obscure the exact dimensions of a coin or bar in order to trick buyers. For example, some customers have been fooled by a fake NGC slab containing a Canadian Gold Maple Leaf coin. The coin is a gold-plated brass allow which is twice the thickness of the real coin; the opaque sides of the plastic case make it impossible to measure the thickness of the coin and determine its authenticity. This sample would measure as consistent with gold on the Precious Metal Verifier Original, but the PMV Pro could be help determine the incorrect sizing.

With the weight entered, the PMV PRO family of products can check for correct sizing of a sample and is able to indicate when a sample is not matching the expected size.

5. **Can the right metal or alloy give a measurement that appears wrong?**

Gold:

High iron content in gold (iron content greater than .005%) can cause the Precious Metal Verifier to read a genuine gold sample outside of the expected range. Almost all mints follow the international standards set for iron content and gold purity, but some poor metallurgical practices cause some gold to have higher iron content. Some samples have such high iron content that they read as fake on the PMV. It is very hard to distinguish between high iron content gold and gold-plated tungsten.

Some customers have reported higher than expected resistivity readings for gold Chinese Panda coins from the 1980s. These coins read outside the expected range to the right by one or two blocks. This high resistivity reading may be due to a high iron content. If a gold coin is the correct size and weight and reads in measurement mode (Page 11 of the PMV Original User Guide) as less than 3.0, then the coin is consistent with slightly impure gold. If the reading is above 4.0, then the sample is consistent with gold-plated tungsten.

Gold Alloys, Platinum and Palladium:

Due to the higher resistivity of gold alloys, platinum, and palladium, the PMV's signal goes much deeper into these metals, and can pass entirely through thin samples. For accurate readings, place the calibration disk on the other side of the sample from the sensor to keep the signal within the sample.

Check the Precious Metal Verifier User Guides for specifics on when a sample is too thin and needs the calibration disk during measurement.

Silver:

Some silver bars marked as .999 silver are less pure than expected. We have seen some cases where an XRF device will measure an apparent .999 silver bar as .995 when the surface of the bar is scraped away. Verify that these bars have the correct size and weight to make sure they have .99+ silver content.

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

a) Remove the sample and re-calibrate.

b) Make sure the correct alloy or metal type is selected.

c) Ensure the sample's size and weight match the expected measurements.

d) Try measuring another place on the sample or on the opposite side.

e) Compare to an unrelated sample of the same alloy.

f) Make sure the sample is not too hot or cold.

g) Make allowance for old coins, the alloy may not have the exact purity that is expected.

h) A calibration disc is supplied with the unit which can be used to check the PMV's sensor. Move to the calibration range by pressing the down arrow until the word 'Platinum-other' appears in the display, then press the right arrow until you get to Calibrator. Press the Run/Cal button and then measure the calibration disc. If this reading is out of range then something is likely wrong with the electronics of the device, so you should contact us at 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.

7. **What are the optional wands for? How deep can they detect false metals under the surface? Can I add wands to a unit that does not have them?**

The Wand attachments allow the Precious Metal Verifier to test a wider range of sample types. A sample must cover the black circle on the face of the PMV in order to be accurately measure; the Wands provide a wider range of sizes sample sizes which can be tested.

The Small Wand is designed to read very thin and small samples, like 1/10oz coins, 1-gram bars, and Combi bars.

The Large Wand is designed to read ¼oz coins or larger and bars that are at least 18mm wide (about ¾ of an inch). The Large Wand can also be useful for slabs which have high bevels that make taking readings on the main sensor challenging. The Large Wand is also useful for rapidly testing coins in albums or cases without removing them.

The Bullion Wand is designed to measure deeper into the surface of the sample than any other sensor for the Precious Metal Verifier. The sample must usually weigh 5oz for the Bullion Wand to make an accurate reading. The Bullion Wand can detect tungsten up to 1.5mm under a cladding of gold.

The main sensor and all 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. A 10 oz silver bar that is 5 mm thick and tested on both sides will have about 3 mm total or 60% of the bar thickness tested. If the entire thickness of the bar needs to be tested, then PMV PRO family of instruments is required to read completely through the bar.

More information on the wands can be found by looking at the sensor specification chart, and the chart listed on page 7 of the User Guide.

Wands must be installed and calibrated by our engineers in the factory. If you would like to add wands to a unit or replace lost wands, you will need to contact us at info@sigmametalytics.com to arrange to send the unit back to us for the upgrade.

8. **What battery type is used inside the Precious Metal Verifier?**

The Precious Metal Verifier uses a Lithium-ion battery type 18650. The charging of this battery is compatible with cell phone chargers or USB ports. A plug-in charger and a USB-A to Micro-B cable is supplied with the equipment. The battery lasts about 8 hours of run-time. The battery is expected to work for at least five years in the device. Should your device have battery problems, factory replacement of the battery is recommended as it is soldered into the equipment.

9. **Do I need to recalibrate the Precious Metal Verifier? What maintenance is needed?**

The unit is calibrated by pressing the button labeled **RUN/CAL** whenever the metal is changed, when the unit is turned on, if the sensor is changed, or on command by the user. **NOTE:** remove any samples from the sensor to calibrate!

Usually factory re-calibration is unnecessary. However, if odd readings are obtained (typically coins that are thought to be good are reading out of range), then re-calibrate to make sure the instrument is giving correct readings. Also, check the Precious Metal Verifier using the Calibration Disk (see page 9 of the User Guide). If the calibration disk measures more than one block away from the center between the brackets, then factory recalibration may be needed.

The unit only needs periodic charging to keep running, there is nothing else needed for measurements. The part of the wands that plugs into the unit needs to be kept clean. It is useful to periodically clean the plugs with isopropyl alcohol.

10. **Why is it that some coins that will not measure on the unit?**

Coins that are attracted to a magnet (iron or ferromagnetic metals) will not be recognized by the unit. The equipment responds to these by requesting repeated recalibrations.

11. **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.

12. **Does the Precious Metal Verifier connect to a computer?**

Yes, it will charge from the computer when plugged into a USB port, though no database or software upgrades are currently available to users via computer.

13. **Does the software need to be upgraded?**

The Precious Metal Verifier uses two types of software. The firmware, which governs the operation of the unit, and the database which specifies the metal types and their test limits.

For most customers, the firmware will never need to be upgraded. The firmware version is displayed briefly when you turn on the Precious Metal Verifier. Units that have firmware version 1.06 to 1.09 can benefit from an upgraded firmware as it will add or improve the measurement mode of the unit and show the charge status when the unit is turned on. Units with a serial number below 4000 cannot be upgraded. Units that have a firmware version 1.12 or higher will not benefit from a change of firmware.

We do not allow for online firmware changes. Units must be sent back to us to have the firmware updated

The database current version is 9-8-2017, units sold before then can benefit from the latest update. Units can have their databases updated from a Windows compatible computer. Contact us at info@sigmametalytics.com for update information.

14. **Why are their two scales for Rhodium?**

Two companies that sell rhodium bars are Baird and PAMP. The Baird bars are a standard type whereas the PAMP process appears to use foamed metal. They are equally valuable for the same weight, but the PAMP bars are less dense than the Baird. The PAMP bars therefore have a different electrical reading than is usually specified for Rhodium, so we have added a range to accommodate the foamed material.

15. **How is accuracy affected on small sized samples?**

Care must be taken when measuring coins smaller than ½ ounce. The circle on the Verifier overlay must be covered by the metal. If the item is bare metal and smaller than the inside of the of circle, then inaccuracy will result. For smaller coins or bars, use the Small wand or Large wand. Make sure that the sample covers the inside rim of the wand. Also, for some coins the test signal will pass completely through the coin resulting in an inaccurate measurement. The signal goes deeper into metals with higher resistivity. Gold alloys, platinum and palladium have resistivities that result in the signal going 2 to 2 ½ times deeper into the metal. For thin coins follow the table on page 7 of the user guide and use the Cal disk method to contain the signal within the sample as indicated on page 9 of the user guide. A good general rule is: if you use the Cal disk as a back-stop and the measurement changes, then the Cal disk method is needed for the sample.

Coins that have high relief (images on the coins that extend higher than is usual above the surface) can produce inaccurate results. If you are using the Small wand then try positioning it on a flatter part of the coin. The main sensor is less sensitive to these variations than the smaller wands. The Bullion wand is least sensitive to these variations, but the metal must be thicker (generally a 5 oz, 300-gram, 10 oz, or larger piece) to get an accurate reading.

16. **How is a measurement outside of the brackets to the left different from a reading outside to the right?**

The rights side indicates higher resistivity and the left indicates lower resistivity. For example, a gold-plated piece of tungsten has about twice the resistivity of pure gold. The sample has a reading higher than expected from the selected metal range (pure gold). This will produce a reading with an arrow to the right. However, 90% Gold alloys have a resistivity about twice that of tungsten. A gold-plated tungsten coin will produce a reading with an arrow to the left as the sample has a lower reading than expected.