

Sigma **O** **Metalytics**

PMV **User Manual** **SM1601**

Precious Metal  **VERIFIER**

ATTENTION

The Precious Metal Verifier is a scientific instrument. There are important conditions to consider when using the device which can impact your results. To get proper readings from your device, please review this manual carefully.

You can find more information on our website at www.sigmametalytics.com

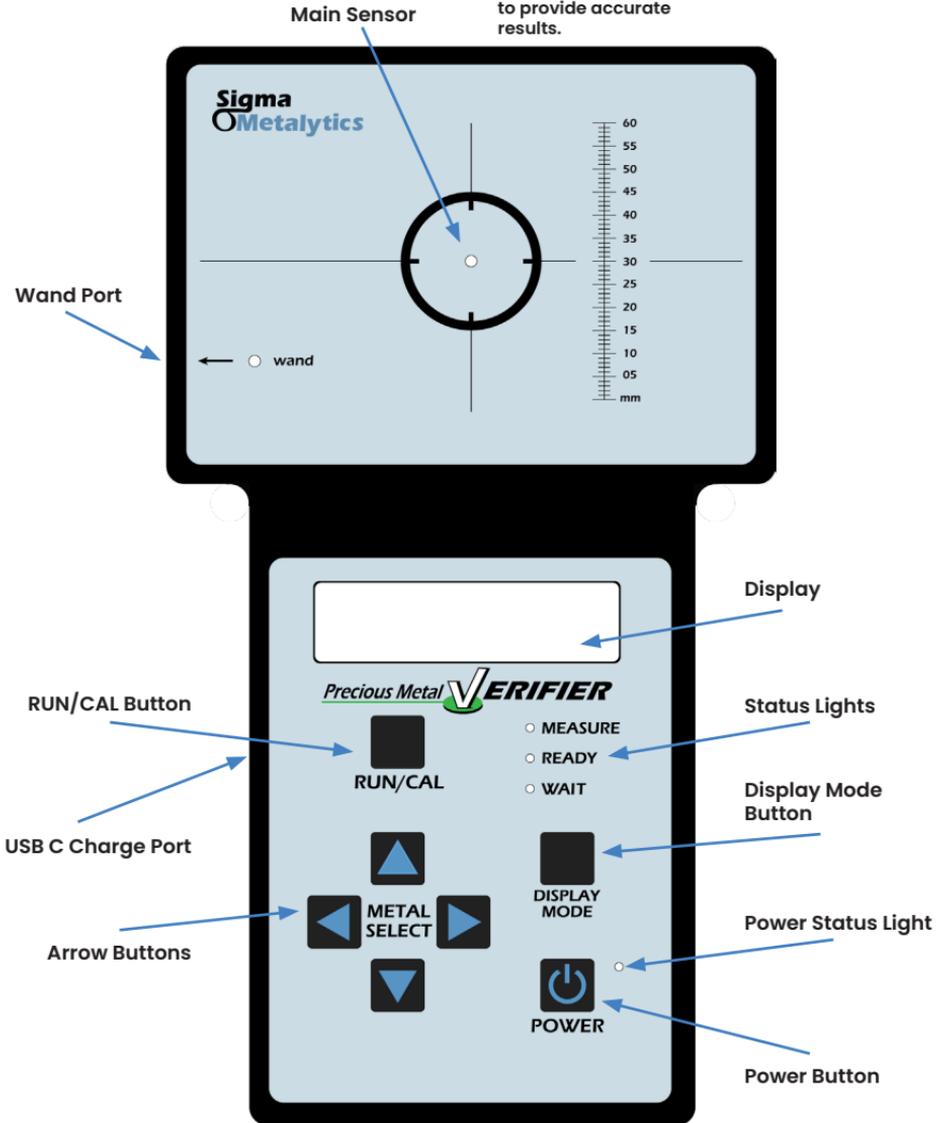
Sigma Metalytics and the Precious Metal Verifier make no claim, guarantee, or promise that measurements made by the Precious Metal Verifier indicate any sample is or is not the selected metal or alloy, whether the reading is within or is not within the bounds consistent with the selected metal or alloy. To ensure accuracy, read the instructions and special conditions which can alter the reading from outside to within the expected bounds or from within to outside the expected bounds. The readings given by the Precious Metal Verifier are INFORMATIONAL ONLY and any judgment about or action taken on any sample is entirely the responsibility of the user.

CONTENTS

Device Diagram.....	4
Instructions.....	5
Results Interpretations.....	6
Measurement Mode.....	7
Density Testing.....	7
Sensor Selection.....	8
Database Explanations	
Gold.....	10
Silver.....	11
Other.....	12
Coins.....	13
Important Notes for Testing.....	15
Battery Charging & Power Management.....	17
Usage Considerations.....	18

DEVICE DIAGRAM

Note: sample must cover the black circle to provide accurate results.



NOTE

The sample must entirely cover the black circle on the face of the device for reliable onboard readings. When using a Wand, the sample must entirely cover the face of the Wand.

Instructions

1. Press **POWER** to turn on the device. Wait until the display reads:

Remove Sample
Push **RUN/CAL** → **Start**

If you are using a Wand, connect it now. The green LED on the testing platform will illuminate to indicate which sensor is in use.

2. Clear all samples from the device. Press **RUN/CAL** to calibrate the device. Ensure there are no samples on the device when you press **RUN/CAL**. If you have a Wand plugged in, ensure the face of the Wand is at least 1 inch away from any metal. Wait until the display reads:

Ready: Place Sample

3. Select the alloy type you would like to test. Use the **UP ARROW** and **DOWN ARROW** buttons to select different categories of alloys and the **LEFT ARROW** and **RIGHT ARROW** buttons to select specific alloys within a category.

4. Once the desired alloy is selected, press the **RUN/CAL** button. Ensure there are no samples on the device when you press the **RUN/CAL** button. The display will then read:

Ready: Place Sample

5. Place your sample on the sensor or touch the Wand to the sample if using a Wand. Make sure your sample meets the minimum requirements to get an accurate test (Page 8). The device will display the results of the test. See Page 6 for interpreting the results.



POWER

REMOVE SAMPLE
PUSH RUN/CAL → START



RUN/CAL

Gold-Pure
READY PLACE SAMPLE

Use   to select between alloy categories.

Use   to select alloys within a category.

Press  once you've selected the desired alloy.
RUN/CAL

Results Interpretation

When testing a sample, brackets will be displayed. The icon and its location indicates the results of the test.

Sample is consistent with the selected alloy type



The box cursor will fall anywhere inside of the brackets if the sample's characteristic resistivity is consistent with the selected alloy type. The box cursor may not be in the exact center of the brackets. That is okay. A result anywhere in the brackets means the sample is consistent with the selected alloy type. *Even on a good result, test the size and weight of the sample to confirm it is the right density.*

Sample is slightly inconsistent with the selected alloy type



If a star cursor falls outside of the brackets, to either the right or to the left, that indicates that the sample is slightly inconsistent with the selected alloy type. There could be reasons for a genuine sample to read outside of the brackets, including but not limited to the sample being:

- Embossed or has high relief or design
- Very cold or very warm relative to the temperature of the device
- Too far away from the sensor
- Too thin or too small for the current sensor (see sensor selection)
- Off center from the sensor
- Very slightly impure, like higher than usual iron content

Confirm that the test is being performed properly. If everything is correct, this is a questionable sample.

Sample is inconsistent with the selected alloy type



An X icon outside of the brackets indicates the sample is highly inconsistent with the selected alloy type and is highly questionable. Further testing, more research, and analysis by other non-destructive methods is highly recommended.



An arrow indicates that a sample is off the scale in that direction. This indicates the sample is highly inconsistent with the selected alloy type.

Measurement Mode

The PMV Measurement Mode allows the user to see the numerical result of the resistivity or conductivity test for a sample rather than the box and bracket result. Measurement mode shows the measured resistivity or conductivity of the sample instead of the box and bracket results. Identical metals will have identical values, which allows unknown alloys or samples to be categorized as similar or different.

To enable Measurement Mode, press the DISPLAY MODE button.

Press the **DISPLAY MODE** button once to put the device into resistivity measurement mode. In this mode, the device will tell you the resistivity value of the sample being tested in microhms-centimeter.

Press the **DISPLAY MODE** button again to put the device into conductivity measurement mode. In this mode, the device will tell you the conductivity value of the sample being tested in megasiemens per meter.

Press the **DISPLAY MODE** button a third time to put the device into the standard box and brackets mode. In this mode, the device will display the test result in the box and brackets method.

Measurement mode is only recommended for advanced users who have specific knowledge about the expected resistivity or conductivity values of their samples.

Density Testing

It is critically important to confirm a sample's density in addition to testing its resistivity. Every precious metal alloy has a unique combination of density and resistivity; by only testing one aspect, the sample is only partially confirmed to be consistent with the genuine alloy. The PMV Original is only testing resistivity and it is up to the user to confirm density separately.

There are many ways to confirm a sample's density is correct. Whatever method you use, the sample should be the right weight and the right size for the alloy. If your sample has published specifications, the simplest way to confirm density is to weigh it and size it (measure thickness and diameter or length and width) and confirm that your sample matches the published specifications.

Sensor Selection

Samples must be tested using the appropriate sensor to get reliable results. Using an incorrect sensor can lead to false negatives and false positives. Use the specifications below to choose the correct sensor for your sample.

Placing the included calibration disk behind the sample during testing can enhance the reliability and allows the sensor to test thinner samples. The column indicating “with Cal Disk” is the minimum testable thickness when using testing with the calibration disk behind the sample.

Onboard Sensor

Category	Min. Diameter	Min. Thickness	Min. Thickness (with Cal Disk)
Gold 99.9%+	24.0 mm	0.9 mm	0.65 mm
Gold Alloys		1.95 mm	1.4 mm
Silver 99.9%+		0.8 mm	0.65 mm
Silver Alloys		0.9 mm	0.65 mm
Platinum		1.95 mm	1.4 mm
Palladium		1.95 mm	1.4 mm
Rhodium		1.3 mm	0.75 mm

Small Wand

Category	Min. Diameter	Min. Thickness	Min. Thickness (with Cal Disk)
Gold 99.9%+	8.0 mm	0.6 mm	0.3 mm
Gold Alloys		1.3 mm	0.75 mm
Silver 99.9%+		0.6 mm	0.3 mm
Silver Alloys		0.6 mm	0.3 mm
Platinum		1.3 mm	0.75 mm
Palladium		1.3 mm	0.75 mm
Rhodium		0.85 mm	0.75 mm

Sensor Selection, Continued

If a sample is providing odd or unreliable test results with a certain sensor, trying testing with one sensor smaller. This can sometimes provide more reliable results.

Small samples can warm up very quickly with handling which may interfere with testing results. If a sample is a different temperature than the device, place both the sample and the device on the same counter and let them come to room temperature for about 10 minutes before testing again.

Large Wand

Category	Min. Diameter	Min. Thickness	Min. Thickness (with Cal Disk)
Gold 99.9%+	18.0 mm	0.8 mm	0.4 mm
Gold Alloys		1.7 mm	1.0 mm
Silver 99.9%+		0.8 mm	0.4 mm
Silver Alloys		0.8 mm	0.4 mm
Platinum		1.7 mm	1.0 mm
Palladium		1.7 mm	1.0 mm
Rhodium		1.1 mm	1.0 mm

Bullion Wand

Category	Min. Diameter	Min. Thickness	Min. Thickness (with Cal Disk)
Gold 99.9%+	24.0 mm	4.5 mm	3.3 mm
Gold Alloys		7.0 mm	6.5 mm
Silver 99.9%+		4.0 mm	3.3 mm
Silver Alloys		4.5 mm	3.3 mm
Platinum		7.0 mm	6.5 mm
Palladium		7.0 mm	6.5 mm
Rhodium		6.3 mm	3.7 mm

Database Options Explained

Gold

The PMV Original's database covers a wide range of alloy options. It's important to select the right alloy setting for your sample. Below is a list of the available alloy options and what they mean.

Gold Pure

Gold samples that are 99.9% or higher purity. This includes 99.99% and 99.999%. These purities are sometimes written as .999, .9999, and .99999.

91.7% 22k Bal Cu

Gold samples that are 91.7% gold with balance copper. These samples are sometimes advertised as 91.67% gold or 22k gold. Balance copper means that the other 8.33% in the sample is copper.

90% Bal Cu

Gold samples that are 90% gold with balance copper. Balance copper means that the other 10% in the sample is copper.

Gold Eagle

American Gold Eagles are 91.67% gold, 3% silver, and 5.33% copper. The American Gold Eagle has a very specific alloy used only in this type of coin. Even though American Gold Eagles have 1 oz of gold in them, they are actually 91.67% gold with silver and copper as the balance metals, which is why they weigh more than 1 oz in total.

Gold Maple Leaf

Canadian Gold Maple Leaf coins are pure gold (99.99% or .9999). Some special edition Maple Leafs are .99999 pure but can still be tested on this setting.

98.6%

98.6% gold balance copper was the alloy of choice for the Austrian Ducat and other historical gold coins.

96.5% Baht

The Thai Baht is minted in 96.5% gold and is a common alloy in many Asian markets.

58% 14K Bal Ag

Some commemorative gold coins were minted in 14k balance copper. These are rare, double check your sample to ensure this is the right alloy selection.

58% 14K 4% Ag Bal Cu

Some commemorative gold coins were minted in 14k balance copper. These are rare, double check your sample to ensure this is the right alloy selection.

Database Options Explained

Silver

Silver Pure

Silver samples that are 99.99% purity. This includes 99.99% and 99.999%. These purities are sometimes written as .9999 and .99999.

92.5% Sterling

Silver samples that are 92.5% silver with balance copper. Balance copper means that the other 7.5% in the sample is copper.

90% Coin 1945-

The U.S. government used to mint coinage in 90% silver and 10% copper alloys. The coin 1960 setting takes is designed for 90% silver, 10% copper coins minted from 1946 to present day. 90% silver samples that were minted between 1946 and present day should be tested on this setting.

90% Coin pre-1900

The U.S. government used to mint coinage in 90% silver and 10% copper alloys. The pre-1900 setting takes into account impurities and contamination present in older coins that the mint was either unable to remove or unaware existed at the time of minting. 90% silver samples that were minted before 1900 should be tested on this setting.

90% Coin 1900-1945

The U.S. government used to mint coinage in 90% silver and 10% copper alloys. The 1900-1945 setting takes into account impurities and contamination present in older coins that the mint was either unable to remove or unaware existed at the time of minting. 90% silver samples that were minted between 1900 and 1945 should be tested on this setting.

96% Britannia

Between 1997 and 2012, Silver Britannia coins were minted with a 95.8% silver and 4.2% copper alloy. Silver Britannia coins from this era should be tested on this setting. Silver Britannia coins from 2013 to present day are minted from 99.9% pure silver alloy.

Database Options Explained

Other

Platinum

Platinum samples that are 99.9% or higher purity. This includes 99.99% and 99.999%. These purities are sometimes written as .999, .9999, and .99999.

Palladium

Palladium samples that are 99.9% or higher purity. This includes 99.99% and 99.999%. These purities are sometimes written as .999, .9999, and .99999.

Rhodium

Rhodium samples that are 99.9% or higher purity. This includes 99.99% and 99.999%. These purities are sometimes written as .999, .9999, and .99999.

Copper

Copper samples that are 99.9% or higher purity. This includes 99.99% and 99.999%. These purities are sometimes written as .999, .9999, and .99999.

Calibrator

If you would like to check if your device is properly calibrated and providing accurate results, select this setting and place the aluminum Calibration Disk (included with your device) on any Wand or the onboard sensor. The result should come up in the brackets. If it does not, please contact us to troubleshoot and setup a repair and recalibration if necessary. Your calibration disk made read one or two steps away from the center, that is normal.

Rhodium - PAMP

Rhodium samples that are 99.9% or higher purity. This includes 99.99% and 99.999%. These purities are sometimes written as .999, .9999, and .99999. PAMP Rhodium bars are minted using a unique process that requires slightly different alloy calibration and a different setting.

Database Options Explained

Coins

Gold Krugerrand or Rand

Gold Krugerrands are 91.67% gold and 8.33% copper. This is technically the same setting as the 91.7% 22K bal Cu setting.

Gold Eagle

American Gold Eagles are 91.67% gold, 3% silver, and 5.33% copper. The American Gold Eagle has a very specific alloy used only in this type of coin.

Gold Maple Leaf

Canadian Gold Maple Leaf coins are pure gold (99.99% or .9999). Some special edition Maple Leafs are .99999 pure but can still be tested on this setting.

Gold Sovereign

Gold Sovereigns were minted by the UK Royal Mint, and they are 91.7% gold, 8.3% copper.

Gold Britannia 1990 - 2012

Between 1990 and 2012, Gold Britannia coins were minted with a 91.7% gold and 8.3% silver alloy.

Gold Britannia 1987 - 1989

Gold Britannia coins in 1987-1989 used a 91.67% gold and 8.33% copper alloy and can be tested with this setting or the 91.7% 22K balCu setting.

Gold Peso

Mexican Gold Pesos are minted as .999 gold and can be tested on this setting or Pure Gold.

Gold Austrian Ducat

98.6% gold balance copper was the alloy of choice for the Austrian Ducat. Austrian Ducats can be tested on this setting or the 98.6% setting.

Gold Guinea

Gold Guineas are 91.67% gold and 8.33% copper.

Gold French 20 Franc

French 20 Franc pieces are minted as .900 gold balance copper and can be tested on this setting or 90% gold.

Gold Isle of Man

Gold Isle of Man coins are 91.67% gold and 8.33% copper.

Database Options Explained

Coins, Continued

Silver Eagle

Silver Eagles are minted in .999 silver. It's critically important to confirm the size and weight of your Silver Eagles in addition to checking resistivity with the PMV Original.

Silver Libertad

Silver Libertads are minted in .999 silver. It's critically important to confirm the size and weight of your Silver Libertads in addition to checking resistivity with the PMV Original.

Silver Maple Leaf

Canadian Silver Maple Leaf coins are pure silver (99.99% or .9999). Some special edition Maple Leafs are .99999 pure but can still be tested on this setting.

Silver Krugerrand

Silver Krugerrands are minted in .999 silver. It's critically important to confirm the size and weight of your Silver Krugerrands in addition to checking resistivity with the PMV Original.

Silver Britannia - 2012

Between 1990 and 2012, Silver Britannia coins were minted with a 95.8% gold with balance copper.

Silver Britannia 2013 -

Silver Britannia coins 2013 and newer have been minted in .999 silver. It's critically important to confirm the size and weight of your Silver Britannias in addition to checking resistivity with the PMV Original.

Silver 80% Canadian Commem.

Some Canadian Silver commemoratives were minted in 80% silver, balance copper.

Important Notes for Testing

Correct Alloy Setting

Some alloys are unique to specific types of coins, and it is important to test a sample on the correct alloy setting. For example, the American Gold Eagle has a unique alloy of 91.67% gold, 3% silver, and 5.33% copper. It will only test properly on the American Gold Eagle setting, not the other 91.67% gold settings.

Modern Sandwich Coins on 90% Silver Settings

Modern sandwich coinage will read within the acceptable range on the 90% Silver Bal Cu setting. Modern coinage is designed to have the same resistivity to ensure they work in coin machines with older coinage. The best way to ensure your quarters are 90% silver is to check their density (weight and size) in addition to the resistivity test.

Checking Calibration

If the PMV is giving inconsistent results or odd readings, and the tests are being performed correctly (on the correct alloy setting, using the correct sensor, sample is within minimums, etc.), then check the device's calibration. If the device's calibration is not correct, then contact us immediately for service. If the device's calibration is correct, then the sample is highly questionable.

To check the calibration, select "OTHER - Calibrator" as the metal type and place the calibration disk on the sensor. The calibration disk should read within the brackets on every sensor.

Magnetic Samples

Samples that are highly magnetic will cause the device to enter a constant re-calibration state when placed on the sensor. If the device is repeatedly asking for recalibration when a sample is placed on the sensor, then use a magnet check if the sample is magnetic. Genuine precious metal pieces are not magnetic.

Conditions that Affect Readings

Thin Samples

The sensor's signal may over-penetrate very thin samples and cause inaccurate readings. Refer to the minimum thicknesses information to make sure the sample meets the minimums for the sensor in use. Place the calibration disk behind the sample and/or switch to a smaller sensor if necessary.

Small Samples

It is important to use the correct sensor size for the sample size. If the sample does not meet the minimum requirements for a sensor, the device will not provide accurate readings.

Samples with High Relief

Samples with very deep stamping, molded samples with large designs, and other high-relief samples may cause inaccurate readings. Try to take a reading from a flat area of the sample to ensure the test is accurate. Most coins and bars will not have this problem.

Bars

Some bars may only partially meet the minimum requirements for the sensors. For example, a long, narrow bar may be longer than the sensor minimum, but may not be wide enough for accurate testing. A bar must meet the sensor minimums in width and length in order to be accurately tested.

Cases

Cases made of plastic and/or cardboard should not affect the test results. However, cases with metal in them will interfere with the testing results.

Similarly, very thick cases may also cause the device to not read the sample if the sample is too far away from the sensor. This is more common in cases with a small or thin sample in a thick case. For example, a 1/4 oz gold piece in a case that normally holds a 1 oz gold piece may be difficult to read due to the case size.

Battery Charging

The PMV contains a rechargeable lithium-ion battery. The battery is high-capacity and the device uses a battery management system to protect the health of the battery and the device.

When the battery is low, the green LED next to the **POWER** button will blink slowly.

To charge the unit, connect the included USB cable to the USB port on the side of the PMV (see Device Diagram). The device can also be charged by plugging the USB cable directly into a computer.

The PMV will still charge when powered off. Whether the PMV is off, the LED will not illuminate while charging. When the PMV is on, the LED will blink and stop blinking when it is fully charged.

If the PMV has not been used for a while, it can take up to 12 hours to fully charge the battery. If the device has been unused for a long period of time, plug it in and charge it overnight before using it.

The charger connector may not appear to be fully “seated” or sit flush with the device. This is normal. As long as a firm connection is made, the device will charge. **Do not over-press the charger port, as this may cause damage to the internal circuitry.**

Power Management

The PMV has built-in features to improve battery life and protect the health of the device.

The device’s display will dim after one minute of no use. Placing a coin on the sensor or pushing any button will restore the backlight.

The device will automatically turn off after five minutes of no use. Power on the device like normal to get back to testing.

When the device powers on, it will check the battery’s charge level. If the charge level is below a certain percent, the battery management system will turn the device off to protect the microprocessor. If this happens, plug the device in to charge for at least 6 hours.

Use Considerations

USE WITH CAUTION

The Precious Metal Verifier (PMV) should not be the sole means for identification of counterfeit coins and bars. Measurement of a sample's electrical characteristic (resistivity or conductivity) is necessary, but not by itself sufficient for such a purpose.

We recommend that you check the item being measured against its specified weight, and size along with the resistivity measurement. You should use your normal visual checks of the material as well.

Other materials have the same resistivity as pure gold, and as such can look like gold on the PMV. These materials will be less dense than gold, so they will be larger or weigh less than the specified value. If you check material that looks good on the PMV, but has the wrong weight or dimensions, then you should not accept the material as consistent with the correct metal.

Do not try to use the PMV to determine what a material is. The PMV will only provide the electrical characteristic (resistivity or conductivity) of the metal, not the atomic structure. Correct use is to have an expectation of the material type (gold, silver, platinum, etc.), and alloy content (22K, coin silver, sterling, .999 pure, etc.), and to verify that the material being tested is consistent with your expectation.

Used in this way, the PMV is a great asset in identifying counterfeit products.



WARNING: Lithium-ion batteries and products that contain lithium-ion batteries can expose you to chemicals including cobalt lithium nickel oxide, and nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.