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GOLDANALYTIX I.DAVID Gold Screen Sensor

Technical Data

- Article number: G-01-0013
- Dimensions device (L x W x H): 15.8 x 7.2 x 3.1 cm
- Dimensions packaging (L x W x H): 29.5 x 26.2 x 11.0 cm
- Weight device: 160 g
- Weight packaging: 1100 g
- Power: 5 W
- Voltage: 5 V (± 10 % max. fluctuation)
- Power supply: Li-Polymer Battery 1200 mAh 3.7 V
- Charging time: approx. 3 h
- Overvoltage category charger: OVCI
- Temperature range: +10 to +40 °C (up to +25°C during charging)
- Recommendation: +18 bis +25 °C
- Maximum operating altitude: 2000 m a. s. l.
- Maximum humidity: 80 %
- Pollution degree: PD2
- Interfaces: USB-C

Introduction

Goldanalytix, a trademark of MARAWE GmbH & Co. KG and founded in 2012, is one of the leading providers of precious metal testing methods in Germany. With the GoldScreenSensor, we offer a testing device for measuring the electrical conductivity using inductive eddy current measurement. The measuring device enables the reliable testing of coins and bars made of gold, silver and other precious metals in the range from 1/4 ounce to approx. 2 ounces (depending on the geometry and material of the object), with a penetration depth of up to 1 mm, and thus contributes to the reliable identification of counterfeits.
By the way: On our homepage at www.davtools.be you will always find the latest version of the instruction manual, so that you can keep up to date with new types of forgery and findings around precious metal testing.

Safety Instructions

IMPORTANT: Please read this instruction manual carefully before using the GoldScreenSensor for the first time. This is for your own safety and to ensure proper operation of the device. Keep the instruction manual in a safe and easily accessible place and, if necessary, pass it on to subsequent users. When using the GoldScreenSensor, please follow the safety instructions.

Definition of signal words and warning symbols
Safety instructions are marked with signal words and warning symbols. Disregarding the safety instructions can lead to personal danger, damage, and malfunction of the device, as well as incorrect results.

Signal words
CAUTION! Indicates a low-risk hazard which, if not avoided, could result in minor or moderate injury and damage to the device or property.

Warning symbols

General warning: This warning symbol is intended to alert the user to potential hazards. All instructions following this warning symbol must be followed to avoid possible injury or damage to the device.

Product-specific safety instructions

Intended use

CAUTION! Do not use the device for any purpose other than the intended usedescribed in this instruction manual. The protective effect of the device may be impaired if the device is not used as intended.

- Goldanalytix is not liable for damage caused by improper use of the device.
- The device may be operated in continuous mode.

Device compatibility

CAUTION! Only use the supplied charger. The use of inferior or incompatible chargers may result in malfunction, damage to the battery and internal electronics, and/or injury.

Repair and modifications

CAUTION! To avoid damage to the device and/or personal injury, do not dismantle the device or attempt any modifications or repairs. If you encounter any problems with the GoldScreenSensor, please contact Goldanalytix (for contact details, see page 34).

- The device does not contain any parts that can be maintained, repaired or replaced by the user.
- Do not open, modify, or rebuild the device. This may invalidate the warranty.
- Repairs by unauthorized persons may endanger the user. Repairs may only be carried out by Goldanalytix itself.

Operating conditions

The device is intended for indoor use only.

- Do not use the device near explosive gases, vapours or dust and protect the device from moisture and wetness. Make sure that no liquid gets inside the device and wipe off spilled liquids immediately.
- Please operate the device in a temperature range of 18 to 25 °C for maximum measuring accuracy. This includes both the ambient temperature and the temperature

of the device and test objects. Do not operate the device in direct proximity of heat sources and avoid fluctuations in temperature.

Cleaning and maintenance

For cleaning the device, use a dry microfiber cloth. The device does not require any special maintenance.

Precautions regarding lithium batteries

CAUTION! Read the precautions regarding lithium batteries carefully. Neglecting to follow the instructions may result in fire, burns, and other hazards or injuries.

- Only use the charger supplied by Goldanalytix to charge the device. The charger may also be connected during operation of the device. The device may be operated during charging.
- If possible, charge the device on non-combustible surfaces and do not leave the device unattended while charging. The charger must be easily accessible during charging to ensure that the device can be safely disconnected from the mains.
- Protect the device from heat (e.g. from continuous sunlight, proximity to hot stoves or microwaves). There is a risk of explosion if the battery overheats.
- Follow the applicable transport instructions for lithium batteries.
- Before disposing of the device, inform yourself about the applicable guidelines and regulations and follow them. More information on the disposal of the device can be found in Chapter 8: Recycling and Disposal.

Disruptive factors

We recommend operating mobile devices (smartphones, mobile phones or flash drives with wireless access) at least 1 m away from the testing device due to the inductive eddy current measurement principle of the GoldScreenSensor. The relatively high radiation density of the devices can lead to incorrect measurements, which are noticeable in the form of strong deviations or fluctuations in the measurement result. Magnets should also be kept at least 1 m away from the testing device in order to avoid interference with the magnetic field of the sensor coil. After restarting, the GoldScreenSensor can be used without any restrictions. WLAN or Bluetooth wireless connections do not affect the measurements and can be operated without hesitation.

Conformity

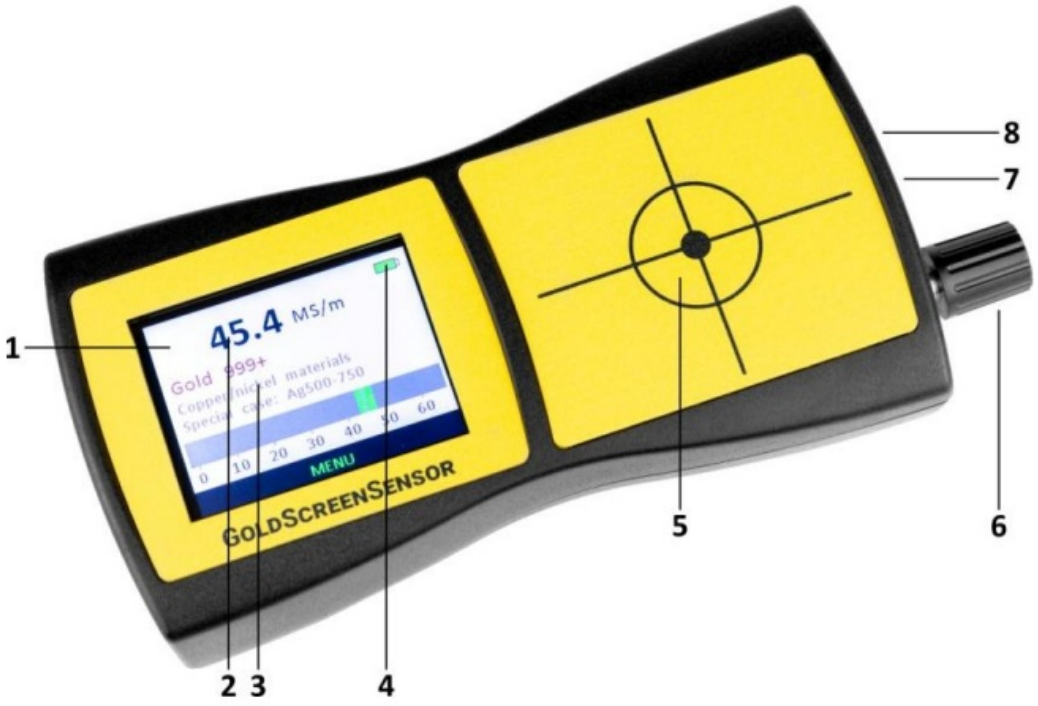
- CE The GoldScreenSensor from Goldanalytix complies with the relevant European Directives regarding health, safety and environmental protection.
- UKCA The GoldScreenSensor from Goldanalytix complies with the relevant British Directives regarding health, safety and environmental protection.

Scope of Supply

GoldScreenSensor Charger Calibration piece Instruction manual Carrying case with inlay Shipping carton

Before initial start-up, please check that the components mentioned above are included in the scope of delivery of the GoldScreenSensor set and that there is no obvious transport damage. In case of any defects, please contact Goldanalytix immediately (for contact details, see page 34).

Operation and Display Elements



1. LCD colour display
2. Output of the measured value in megasiemens per metre (MS/m)
3. Allocation of the corresponding (precious) metals, alloys and counterfeit materials
4. Display of the state of charge
5. Measuring circle
6. Rotary knob for operating the device
7. Reset button
8. Charging socket

Starting and Operating the Device

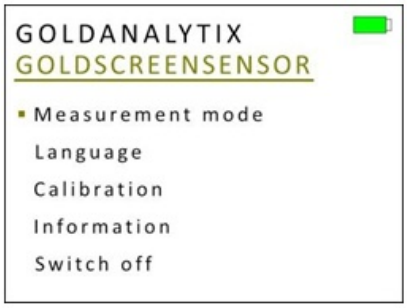
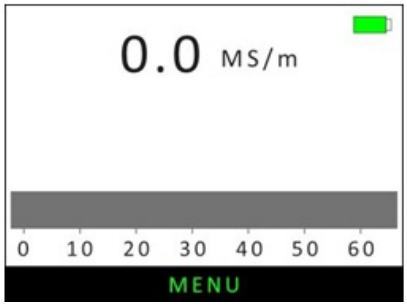
Starting the device

In order to switch on the device, please push the rotary knob 6 into the direction of the case.

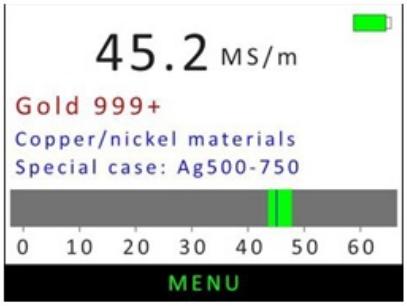
Main menu and performing measurements

After activating the device, you will get to the main menu:

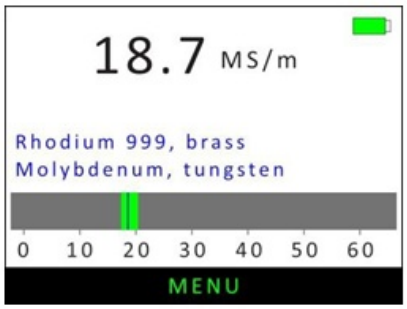
Display	Description

	In the main menu, you can select a menu option by turning the rotary knob and confirm the entry by pre ssing the knob. You are then taken to the respective submenu.
	To test your object, select “Measuring mode”. Place the test object quickly from above and as centrally a s possible on the measuring circle **5**. The measure ment starts automatically.

Possible display for fine gold:



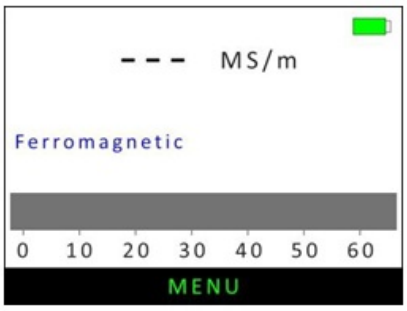
Possible display for tungsten co unterfeit:



The determined conductivity value is shown in the u pper section of the display as a number in the unit megasiemens per metre (MS/m). To the conductivit y values, corresponding precious metals and alloys are assigned, which are displayed in red below the conductivity value. Supplementary information is dis played below in blue lettering where applicable. In a ddition to the precious metals, typical counterfeit m aterials, such as tungsten or tungsten-copper alloys , as well as special cases are also displayed in blue lettering.

In addition, a cursor gives you a graphic overview of the position of the conductivity value on a scale o f 0 to

65 MS/m in the lower section of the display. The res pective tolerance ranges are highlighted in green.

Possible display for ferromagnetic materials: 	The figure on the previous page shows an example of the output for a coin made of fine gold. The figure below shows a possible result in the case of a coun terfeit made of tungsten. The GoldScreenSensor also detects ferromagnetic objects (e.g. objects made of iron, nickel and most (stainless) steels), which you can recognize by the “ Ferromagnetic” output. After the measurement, remove the object from the measuring surface and wait at least 5 seconds befo re placing the next object on it. Press the rotary knob to return to the main menu.

Important information on measuring with the GoldScreenSensor:

1. In measuring mode, the device always shows the measured conductivity as well as the material it COULD be. A 50 euro cent coin, for example, has a similar conductivity to the Krugerrand gold coin, platinum or palladium (all in the range of 9 to 10 MS/m). Therefore, when measuring the 50 cent coin, the device will output below the conductivity value the information e.g. Gold 916(A). However, a comparison of dimensions and weight shows that it cannot be a Krugerrand.
2. Slight variations in the measurement results of the same test object are completely normal, as are slight deviations when an object is measured once with and once without packaging. What is important is that the values are within the respective tolerance range.
3. Please note that the device requires a warm-up time of around 2 minutes. If test objects are measured before the warm-up time has elapsed, this can lead to value

deviations and incorrect measurement results. The warm-up time should always be observed after not using the device for more than half an hour.

4. Always wait at least 5 seconds between two consecutive measurements. If the test objects are placed too quickly one after the other, this can lead to value deviations and incorrect measurement results. If there is any doubt about the accuracy of the displayed value, remove the test object again, wait a few seconds longer and then place it back on.
5. Use the device at temperatures of 18 to 25 °C to obtain optimum measurement results. This includes both the ambient temperature and the temperature of the device and test objects. As the electrical conductivity is temperature-dependent, extreme temperatures and fluctuations in temperature can lead to value deviations and incorrect measurement results.
6. Do not hold the test objects in your hand for too long before the measurement and thus warm them up. As the electrical conductivity is temperature-dependent, an increased temperature of the objects can lead to value deviations and incorrect measurement results.
7. Ensure that the test objects are placed quickly on the measuring surface. Avoid hovering just above the measuring surface with the test objects before placing them. Maintain a distance of at least 2 cm to the measuring surface.
8. Ensure that the test objects are always placed in the centre of the measuring surface. Use the black crosshairs as a guide.
9. Ensure that the test objects are placed on the measuring surface from above. Do not slide the test objects onto the measuring surface.
10. Always measure each object from both the front and the back.
11. Test objects should have a minimum diameter of 2 cm so that the measuring coil is completely covered and reliable measurement results are obtained. This is guaranteed if the test objects completely cover the yellow area in the crosshairs. For smaller objects, the Goldanalytix GoldScreenPen is recommended. Of course, the GoldScreenSensor also measures 1/10 ounce coins that do not completely cover the measuring coil. However, the measured conductivity value will be lower than expected for the respective alloy, as the air above the measuring coil is measured alongside the test object and influences the measurement result.
12. To ensure reliable measurement results, test objects in the low conductivity range (approx. 0 – 20 MS/m) should have a minimum thickness of 1.2 mm. For test objects

in the higher conductivity range, such as fine gold or fine silver, a minimum thickness of 0.9 mm is necessary.

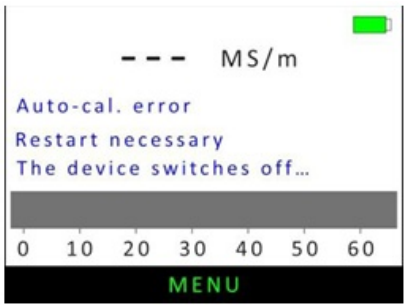
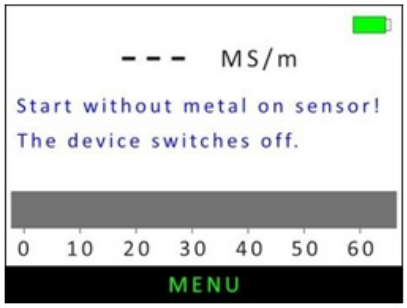
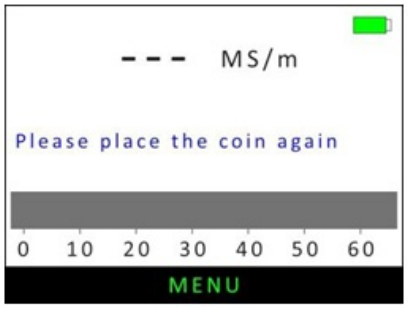
13. The GoldScreenSensor also measures through blisters and capsules, but the thickness of the capsules at which reliable results can still be achieved is limited. The maximum capsule thickness depends on both the size of the measured object and its conductivity. For an overview, please refer to the following table. The values refer to the thickness of the capsule between the test object and the measuring surface. Please note that NGC packaging cannot be measured due to its thickness. If there are metallic components in a supposed plastic packaging, a reliable measurement cannot be guaranteed.

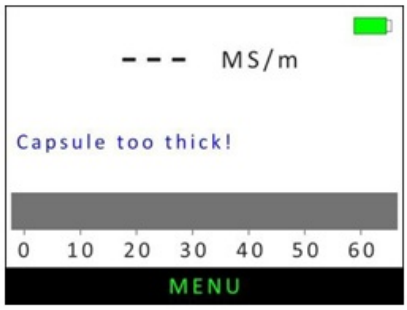
Objects	**Conductivty range**	**Maximum capsule th ickness**
1/4 ounce coins a.o. Ducat, Vreneli, Sovereign	0 – 65 MS/m	1.0 mm
Coins and bars from 1/2 ounce	34 – 65 MS/m	2.0 mm
Coins and bars from 1/2 ounce	0 – 34 MS/m	2.5 mm

14. Information on measuring objects in capsules: Place the object in the capsule on themeasuring surface. During the measurement, apply gentle pressure to the capsule with a finger to ensure that no air gaps distort the measurement results.
15. Heavy embossing or fluting of the test objects can significantly influence the measurement result, as the uneven surface creates air gaps that can falsify the measurement. An example are the old Dürer silver coins. For such objects, measurement with the Goldanalytix GoldScreenPen is recommended.
    Please also note the special cases in Chapter 6: Evaluation and Interpretation of the Results!

Device error messages:

Display	**Description**

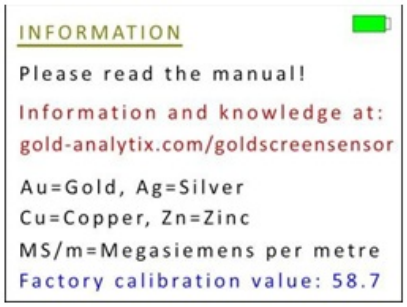
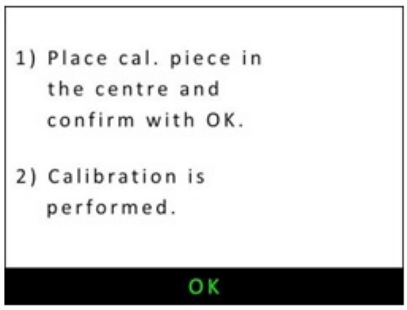
	An auto-calibration is performed automatically each time the device is switched on. If an error occurs du ring this calibration, the error message shown on th e left will be displayed and the device will switch off automatically. In such a case, you must restart the device.
	Ensure that there is no test object or other metallic object on the measuring surface when switching on the device. If there is an object on the measuring su rface, the error message shown on the left will be d isplayed and the device will switch off automatically. Remove the object from the measuring surface and restart the device.
	If a test object is left on the measuring surface for a longer period of time, the error message shown on t he left will be displayed. Remove the object from th e measuring surface, wait at least 5 seconds and pl ace the object back on the measuring surface or se lect a new test object.

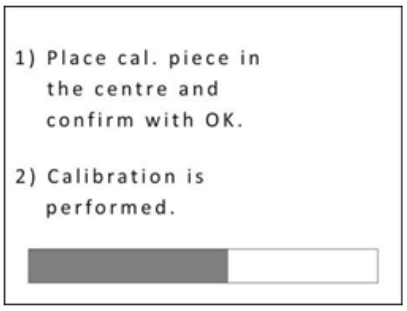
	Objects in capsules can be measured reliably up to a certain capsule thickness. However, if the capsule exceeds the maximum thickness, reliable measure ment is no longer possible and the error message s hown on the left will be displayed. In this case, it is advisable to remove the object from the capsule if p ossible and measure the object again. Otherwise, v erification with the GoldScreenSensor cannot be ca rried out.

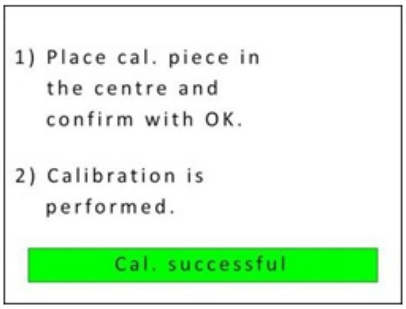
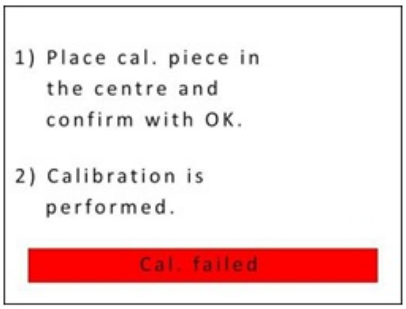
Calibrating the device

Your GoldScreenSensor is calibrated before delivery, so a calibration before the first measurement is normally not necessary!

Display	**Description**

	If the measurement results you receive seem unusual or if you take measurements outside the recommended temperature range, calibration may be necessary. To check whether calibration is necessary, please proceed as follows: First open the info screen by selecting the menu option “Information” in the main menu. The specific target value for your calibration piece is shown in blue at the bottom of the display – in our example 58.7. The value in your device may differ slightly from our example, as each device is set to an individual calibration piece. Note your specific calibration value and then switch to measuring mode. Place the calibration piece on the measuring surface; the GoldScreenSensor will then carry out a measurement. Compare the measured value with the noted calibration value. If the measured value deviates by more than **+/- 1.0**, calibration is advisable.
	To carry out the calibration, select the menu option “Calibration” in the main menu. Only use the calibration piece supplied with your device, which is specially matched to your device, for calibration. After selecting the calibration, instructions are shown on the display.

	Place the calibration piece on the measuring surfac e and ensure that the sticker labelled “OBEN/UP” is facing upwards. Confirm the calibration by pressing the rotary knob. Only then does the calibration start, whereby the calibration piece should no longe r be touched.

 	After successful calibration, you will receive confirm ation on the display (top left figure). If the calibration fails, a corresponding message will also be displayed (bottom left figure). If you do not confir m the calibration by pressing the rotary knob, the device automatically returns to the main menu after a few seconds. Possible reasons for a failed calibration may be: · The calibration piece was removed from the measuring surface before the calibration was compl eted. · Calibration was started without the calibration piece on the measuring surface. · The wrong calibration piece was used. Alway s use the calibration piece supplied with the device.

Changing the system language

Follow the “Language selection” in the main menu by pressing the rotary knob. You can now select your desired language. You will then automatically return to the main menu.

Restarting the device

If the device no longer responds to the usual operation and can no longer be switched off, you can restart it using the reset button. The reset button is located next to the charging socket (see illustration on page 24). Use for example a bent paper clip to press the reset button. The device will switch itself off. You can then restart and operate the device as usual.

Evaluation and Interpretation of the Results

Below you will find important information on how to interpret the determined conductivity value. Please note that the device only measures the electrical conductivity inside the test object. To the conductivity values, corresponding precious metals and alloys, as well as typical counterfeit materials, are assigned in defined tolerance ranges. Your task is to check whether the displayed values correspond to the expectations for your test object. An example: For an object made of fine gold, Gold 999(+) must be displayed. Any deviation indicates a possible counterfeit. If the device displays e.g. Gold 900 for this object, this does not mean that the object is made of Gold 900 instead, but that it lies outside the correct conductivity range and therefore shows irregularities. Please refer to the conductivity overview in the appendix for additional reference values.

IMPORTANT: A correct conductivity value alone is of course no guarantee that your object is not a fake. This is because an alloy that has the same electrical conductivity as gold or a gold alloy, for example, can definitely be produced (e.g. silver-copper alloys). However, in such a case, the dimensions or weight of the coins and bars are usually not correct. After all, it is relatively easy to imitate one physical property (conductivity, density, sound, etc.) of a precious metal. To imitate two or more physical properties at the same time, however, is more difficult or almost impossible. Therefore, if the conductivity is the same, another physical property such as density will not match. We therefore strongly recommend the use of several testing methods in order to exclude counterfeits with certainty. This is because no single non-destructive method for testing precious metals can detect every type of counterfeit on its own.

The following procedure is recommended for typical bullion coins:

1. Determine the weight using a precision balance: Does the determined weight correspond to the target weight?

2. Determine the dimensions (thickness and diameter) using a digital caliper: Do the determined dimensions correspond to the reference values? The corresponding reference values can be found on the Internet, e.g. on the manufacturer's website.
    - If the weight and dimensions correspond exactly to the reference values, it can only be a counterfeit with materials of the same density. In the case of fine gold, for example, these are metals such as tungsten and tungsten alloys or, in the case of silver, lead-tin alloys and molybdenum. Steps 1 and 2 can alternatively be replaced by checking the density with the density scale from Goldanalytix (DensityScreenScale).
3. Measure the electrical conductivity with the GoldScreenSensor
   Is the determined conductivity value within the corresponding tolerance range? In this way, sub-alloys and counterfeits with foreign metal cores can be identified.

Counterfeits that successfully pass steps 1 to 3 are theoretically possible, but are rather unlikely in practice. For almost one hundred per cent certainty, another testing method should be used, such as checking the magnetic properties with the magnetic scale from Goldanalytix (MagneticScreenScale). Depending on the conductivity of the material, the GoldScreenSensor penetrates the respective metals or alloys to different depths. The following table provides an indication of the respective penetration depths for selected conductivity ranges:

Objects	**Conductivity range**	**Penetration depth**
Low conductive materials, e.g. lead and nickel silver	0 – 8 MS/m	Up to 1 mm
900 and 916 gold alloys, e.g. Krugerrand	8 – 18 MS/m	700 µm / 0.7 mm
Objects/coatings made of fine gold	43 – 49 MS/m	300 µm / 0.3 mm
Copper and silver	49 – 65 MS/m	250 µm / 0.25 mm

The penetration depth of the GoldScreenSensor decreases as the electrical conductivity

of the material increases. The information on the penetration depth refers to the depth at which the eddy current density has fallen to 37% of the surface density, the so-called “standard penetration depth”. The penetration depths of the GoldScreenSensor are normally more than sufficient, considering that, in our experience, most galvanic gold or silver layers on counterfeits are only 10 to 60 µm thick. It is also conceivable that higher penetration depths can be achieved for many counterfeits, but this depends on the respective conductivity ratio between the coating and core material. The penetration depth values therefore indicate how deep the GoldScreenSensor penetrates into the respective pure material and determines the size up to which precious metal objects can be measured. In principle, 1 kg bars can also be measured with the device – the correct conductivity value is output. However, with such large objects there is a risk that forgers will apply thicker layers of precious metal around the foreign metal core. For bars weighing 50 to 100 g or more (depending on the geometry and material of the object), we recommend the additional use of the ultrasonic method using the Goldanalytix BarScreenSensor.

Please also have a look at our website www.davtools.be knowledge for more information about the correct procedure for the non-destructive testing of precious metals. However, absolute certainty, especially regarding the exact composition of the test objects, can only be provided by a destructive, chemical analysis.

Special cases

Jewellery

Jewellery and also some medals cannot be successfully tested with the GoldScreenSensor. Even if a piece of jewellery is completely contiguous and the measuring coil is completely covered, the alloy is usually not known in detail. At best, one knows the gold content, but the other unknown components of the alloy have an unpredictable effect on the conductivity. For jewellery testing, we therefore recommend the Goldanalytix CaratScreenPen, which determines the gold content of jewellery alloys.

Older coins/bars

Older coins/bars (defined here as coins/precious metals before World War II) and especially objects from the 19th century may vary in their composition. Although the gold content is correct, some coins may show variations in the remaining composition. Due to

the less than optimal manufacturing and analysis conditions at the time, such coins may have been contaminated with other metals, changing the conductivity of the coin and making it often impossible to reliably authenticate older coins and bars with the GoldScreenSensor.

Bicolour coins

Bicolour coins made of two different materials cannot be successfully tested with the GoldScreenSensor. Due to the different conductivities of the metals, no conclusive conductivity value can be determined. For testing bicolour coins, we recommend using the Goldanalytix GoldScreenPen, which allows you to test the materials individually.

Silver coins with a fineness of less than 900

Silver has the highest conductivity of all metals. Even a proportion of just one per mille of foreign metal in silver coins leads to a relatively high drop in conductivity. For silver coins with a fineness of less than 900, the effect of the drop in conductivity is particularly strong. It is therefore not possible to determine the exact silver content for alloys in the range of 500 to 890, especially for typical silver commemorative coins, by using the GoldScreenSensor. As the differences in conductivity between various silver alloys are sometimes minimal, the different relevant alloys (e.g. Silver 835 from the Latin Monetary Union) were grouped into larger ranges. This makes it possible to check whether the conductivity is plausible for the presence of silver. The important distinction between fine silver and silver 900/925 is not a problem.

Silver coins special cases

Our tests have shown that there are 999 silver coins that have lower conductivity values in the range of 56-59 MS/m when measured with the GoldScreenSensor and are therefore output as “special cases”. These coins include the 1 ounce Krugerrand silver coins, the “Owl of Athens” and some of the Tokelau coins. Possible reasons could be a particularly unusual minting or shape, or that the remaining one per mille of the alloy contains ferromagnetic materials.

Gold coins special cases

Fine gold coins that are in particularly thick capsules (more than 2 mm thick) can have higher conductivity values in the range of 48-49 MS/m when measured with the

GoldScreenSensor.

5 DM commemorative coins

Particularities of the 5 DM commemorative coins from 1979 (Otto Hahn) to 1986 (Frederick the Great): This series of commemorative coins has a weight of 10.0 g (previous years 11.2 g) and is made of a copper-nickel alloy with a nickel core (previous years Silver 625). These coins show a conductivity of about 2.4 MS/m (Silver 625 at approx. 47.0 MS/m).

Alloy impurities e.g. for Vrenelis 20 CHF

The range of possible impurities and their consequences are impossible to analyse in their entirety. However, in our tests we found that Vrenelis 20 CHF, for example, sometimes had 10 to 20 times the iron content of cleanly produced Vrenelis of the same year. The gold content was correct for all coins (90 % gold content), but for some coins a significantly higher iron content in addition to copper was detected using other analysis methods, which suggests an impure alloy composition. As the GoldScreenSensor is a very precise eddy current measuring device, such impurities are detected and lead to lower conductivity values for the measured coins. Such coins are not counterfeits, but merely uncleanly crafted variants of genuine coins, which often contain ferromagnetic impurities (iron or nickel). It is therefore essential to use other testing methods for such coins (e.g. density testing or XRF-analysis) in order to distinguish whether the coin is indeed a fake of just one of the cases described above.

Warranty and Support

Do you need more information about our devices, support in using the GoldScreenSensor or the customer service? Feel free to contact us through one of the following channels:

Homepage: www.davtools.be
E-Mail: info@davtools.be
Phone: 432 (0) 3225 21 29

Our high quality precious metal testers are designed for a long lifetime. However, if any problems should occur with a device, it is good to know that we offer a legal warranty of 2 years. The warranty period starts with the receipt of the product. In case of a warranty

claim, after repair or replacement of the device, the warranty period starts again with the receipt of the product.

IMPORTANT: The warranty applies only to devices that have been properly used as described in this instruction manual and have not been misused, repaired by unauthorized persons, or modified.
The GoldScreenSensor is a good tool for verifying the authenticity of precious metals – however, in the end you are responsible for your own transactions. We assume no liability for any possible financial losses that may result from the use of the GoldScreenSensor.

Recycling and Disposal

 The GoldScreenSensor is marked in accordance with the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE). The symbol of the crossed-out dustbin indicates that this electrical or electronic device must not be disposed of with normal household waste at the end of its lifetime, but must be takenfor separate collection by the end user. Please follow your country's rules for the separate collection of electrical and electronic equipment. For more information on recycling, please contact your local authority. The GoldScreenSensor is marked in accordance with the European Directive 2006/66/EC on batteries and accumulators. The symbol of the crossed-out dustbin on batteries or accumulators indicates that this device contains a built-in battery or accumulator which must not be disposed of with normal household waste at the end of its lifetime, but must be taken for separate collection by the end user. Please follow your country's rules for the separate collection of batteries and accumulators. For more information on recycling, please contact your local authority. The following batteries or accumulators can be found in this electrical device: Rechargeable (secondary) battery [glued-in accumulator] with the chemical system [Li-Ion-Polymer]. Instructions for safe removal: This accumulator can NOT be removed from the device by the end user, but can be replaced by Goldanalytix in the course of repair.
Thank you for your contribution to the protection of the environment!

Conductivity overview of typical alloys for investment precious metals

Designation	Type	Target conductivity [MS/m]*	Tolerance range Conductivity	Fineness [‰]	Density [g/cm^3]
Gold 999(+)	A	**44.7**	42.0-47.9	999/999.9	19.3
Gold 995	B	**35.2**	34.0-36.5	995	19.2
Gold 986	C	**25.5**	24.6-29.5	986	19.0
Gold 980	D	**22.6**	20.5-24.6	980	18.8
Gold 916 (A)	E	**9.7**	9.4-10.6	916	17.5
Gold 916 (B)	F	**11.1**	10.6-11.6	916	17.8
Gold 916 (C)	G	**11.8**	11.6-12.5	916	17.8
Gold 916 (D)	H	**16.4**	15.3-17.5	916	18.1
Gold 900	I	**8.9**	8.4-9.4	900	17.2
Silver 999(+)	J	**61.0**	59-65	999/999.9	10.5
Silver 958	K	**54.5**	53-56	958	10.4
Silver 925	L	**51.0**	49-53	925	10.4
Silver 900	M	**50.2**	49-53	900	10.3
Silver 835	N	**48.5**	48-49	835	10.2
Silver 625	O	**47.0**	46-48	625	9.8

Conductivity values at 20 °C // Please note the special cases in chapter 6.

Type A	Investment gold bars (Degussa, Umicore, Heraeus, Agosi etc.), Vienna Philharmonic, American Buffalo, Kangaroo Nugget, Maple Leaf, China Panda, Mexiko Libertad, Australia Lunar, Coins Germany (100 marks collector coins etc.), UK Gold Britannia (since 2013), Spain 5000 to 80000 pesetas
Type B	Common alloy mainly in Turkey (Nzp, Nadir, Altin) and India (RSBL); special case: AUT shillings 500/1000
Type C	The target value is for objects that are thicker than 1 mm. The 1&4 ducat coins Austria and their restrikes (0.71-0.75 mm) have a slightly higher conductivity value (27-29 MS/m).
Type D	Ducat gold medal and other medals
Type E	South Africa Krugerrand, UK Gold Britannia (1987-89), Canada 100 dollars, Turkey 100 piastres (Note minimum thickness!), Australia Koala 200 dollars, UK Sovereign, Chile 5 pesos (1895-1980) & 20 pesos (1896–1917), Peru Libra (1898-1969), Peru 50000 & 100000 soles *(916 Au + 84 Cu)*
Type F	American Gold Eagle from the US Mint since 1986, nominal value in US dollars *(916 Au + 54 Cu + 30 Ag)*
Type G	UK Gold Britannia (1990-2012) *(916 Au + 42 Cu + 42 Ag)*
Type H	Common alloy mainly in Latin America and Canada, e.g. Canada 200 dollars 1990 *(916 Au + 84 Ag)*

Type I	Germany Reichsmark, Austria Crown Emperor Franz Joseph until 1915 & res trikes, Greece Drachme, Austria Babenberger, Austria Florin, Swiss Vreneli (2 0-100 FR, 1897-1949), Netherlands Wilhemina, France Marianne/Napoleon/Republic, Itay Umberto I, Vittorio Emanuele II, Denmark Frederik VIII, Belgium Albert/Leopold II, Russia Ruble Alexander III/Nikolaus I I, Russia Tscherwonetz, US Liberty Head / Double Eagle, Chile Peso (excepti ons see Type E), Mexico Centenario, Peru 5 to 10 soles (1956-1979), Spain 10 to 100 pesetas
Type J	Canada Maple Leaf, Vienna Philharmonic, American Silver Eagle, Australian Koala / Kookaburra, UK Britannia Silver (from 2013), Armenia Noah's Ark, Chi na Panda, Lunar, Mexico Libertad (from 1996)
Type K	UK Britannia Silver (1997-2003)
Type L+M	Austria Maria Theresia Taler, many medals, 10 € commemorative coin 2002-2 010 and 20 € 2016–today, the values are only valid for 900 and 925 silver or copper alloys & coins after 1945, older coins are sometimes made of silver-nickel alloys – ranging from 35-38 MS/m!
Type N	Latin Monetary Union, francs, lira, etc.
Type O	DM & € commemorative coins FRG, e.g. 5 DM 1953-1979, 10 DM 1987-1997 & 10 € 2011-2015

A2. Conductivity overview of more precious / foreign metal (alloys)

Further precious metals	**Electrical conductivity [MS/m]**	**Density [g/cm³]**
Platinum 999	**9.1**	**21.45**

Palladium 999	**9.3**	**11.99**
Osmium	**10.9**	**22.59**
Ruthenium	**about 14.1**	**12.37**
Rhodium (sintered)	**18.5**	**12.38**
Iridium	**about 19.7**	**22.56**
Foreign metals and alloys	**Electrical conductivity [MS/m]**	**Density [g/cm³]**
Copper (pure)	**58.0**	**8.96**
Copper alloys	**41-57**	**depending on the alloy**
Aluminium (pure)	**36.5**	**2.7**
Brass	**13-33**	**about 8.5**
Magnesium	**23**	**1.74**
Molybdenum	**19**	**10.2**
Aluminium alloys	**15.9-30.5**	**depending on the alloy**
Tungsten (pure)	**about 18.8**	**19.3**
Tungsten alloys	**20-28**	**depending on the alloy**
Zinc	**17**	**7.14**
Tin	**7.9**	**7.3**
Chromium	**7.8**	**7.19**
Tantalum	**7.6**	**16.6**
Lead	**4.8**	**11.34**

Nickel silver	**3.2-5.7**	**about 8.1 – 8.7**
Antimony	**2.4**	**6.68**
Tungsten (sintered)	**<2**	**about 19.3**
Titanium	**0.5-2.5**	**4.45**
Bismuth	**0.9**	**9.8**
Iron	**Ferromagnetic**	**7.87**
Nickel	**Ferromagnetic**	**8.9**
Cobalt	**Ferromagnetic**	**8.9**

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FAQs

Q: Is calibration required before every use?
A: The GOLDSCREENSENSOR comes pre-calibrated and usually does not require calibration before the first measurement.

Q: What is the maximum capsule thickness supported by the GOLDSCREENSENSOR?
A: The GOLDSCREENSENSOR supports maximum capsule thicknesses of 1.0 mm, 2.0 mm, and 2.5 mm for accurate measurements.

Q: How should I interpret the results when testing for alloy impurities?
A: When testing for alloy impurities, refer to the provided guidelines and compare the results with known purity levels for accurate interpretation.

Documents / Resources

	GOLDANALYTIX I.DAVID Gold Screen Sensor [pdf] Instruction Manual I.DAVID Gold Screen Sensor, Gold Screen Sensor, Screen Sensor, Sensor

References

- User Manual

GOLDANALYTIX Gold Screen Sensor, GOLDANALYTIX, I.DAVID Gold Screen Sensor, Screen Sensor, Sensor

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