# DSI-2

Device for measuring EMF – potential of activated water

**Description and operating instructions**

"DSI-2" - this isn't an ORP meter, but EMF meter for measuring EMF - potential **only activated low-mineralized aqueous solutions**, in a nonequilibrium thermodynamic state (NTS) with excited dissipative Resonant Microcluster structures (RM) and Supercoherent Radiation (SR). EMF - potential is a measure of the degree of activity of water and aqueous solutions (more * https://eng.ikar.udm.ru/dsi-2.htm).

DSI-2 characterizes the degree of activation and is especially convenient for comparing the antioxidant properties of aqueous solutions before and after activation, because does not contain "dripping electrodes". This ensures its reliability, economy and long term of use in comparison with conventional ORP meters, which require their replacement once a year or six months..

Application area - measuring the EMF potential of water, both in the field and in laboratory conditions, in aquariums, swimming pools, in water treatment systems, activators, etc.. **Do not use DSI-2 for acids and alkalis**.

**Main technical data**

**and characteristics**

- Measurement range: 0 ± 1999 mV;
- Working temperature 0-50°C;
- Value of division 1 mV
- Accuracy ± 5 mV;
- Power supply: batteries 4 x 1,5 W (LR44) included;
- Duration of battery life - over 1000 hours;
- Measurements 157 x 27 x 20 mm;
- Weight 46 g.

The device is supplied in an impact-resistant plastic case.

**Operating procedure**

For the correct implementation of EMF measurements, the surface of the electrodes must be clean and smooth. The electrodes must be protected from any mechanical influences that could damage their surface. After and before carrying out EMF measurements, it is recommended to rinse the electrode surfaces in distilled water.

**Measurement procedure**

Turn on the device using the ON / OFF switch located at the top of the device.

Remove the protective cap. Immerse the sensor (lower part of the device) for 10-30 seconds in distilled water, then in the test solution. **It is strictly forbidden to immerse the device more than 2.5 cm.** The device should not touch the walls and bottom of the vessel. Stir the solution to be analyzed until the reading on the display stabilizes.

After measurements, the sensor must be rinsed in deionized or regular water and stored in a protective cap.

## Control and maintenance

Clean the tips of the electrodes with a soft, lint-free cloth soaked in a cleaning solution (weak solutions of nitric acid, anolyte) and rinse in deionized or plain water.

To replace batteries, unscrew the top battery cover. Insert 4 new 1.5 V batteries with correct polarity and close the battery compartment. Always replace all batteries at once.

Tap water,
EMF=+366 mV

Fresh orange
EMF=-138 mV

Juice activated
on "IKAR" (mod.04)
http://ikar.udm.ru/i-si-04.htm
EMF=-430 mV

## Completeness of delivery

- Pocket device EMF – 1 p.
- Batteries on 1,4 V – 4 p.

The following solutions are available on special order:

- Solution for EMF control.
- Anolyte solution (ANK-VK).

## Warranty obligations

R&C “IKAR” provides a 1 year warranty from the date of sale in the absence of damage to the case, electrodes and compliance with the Operating and storage instructions.

Date of sale

“_____” _____20___ г.

***** **https://eng.ikar.udm.ru/dsi-2.htm**: A method for registering the properties of a non-equilibrium liquid (Shironosov V.G. - A method for determining the activity of a structured liquid. Application for an invention of the RF No. 2007127132 dated 16.07.2007. International application for an invention under PCT A18058 dated 14.07.2008). A method for detecting a cluster structure and microclusters of a liquid (Shironosov V.G., Kuznetsov E.V. Application for an invention of the RF No. 2007127133 dated 16.07.2007. International application for an invention according to PCT A18056 dated 14.07.2008).

# Useful links

https://eng.ikar.udm.ru/dsi-2.htm

1. **A method for registering the properties of a non-equilibrium liquid** (Shironosov V.G. - A method for determining the activity of a structured liquid. Application for invention of the RF No. 2007127132 dated 16.07.2007. International invention application under PCT A18058 dated 14.07.2008).
2. **Method for detecting cluster structure and microclusters of liquid** (Shironosov V.G., Kuznetsov E.V. Application for an invention of the RF No. 2007127133 dated 16.07.2007. International application for invention under PCT A18056 dated 14.07.2008).
3. **Features of measuring the ORP for nonequilibrium systems in the region of negative values** – see. http://ikar.udm.ru/faq.htm: RU

3.1. Explain the features of measuring the ORP value in the area of negative values. RU
3.2. The agony of choosing a device for measuring the ORP of water... RU
3.3. ORP measurement. RU
3.4. Tell me how to measure the readings of conventional ORP meters and your DSI-2 device? RU
3.5. Which device gives the maximum ORP delta? RU
3.6. The DSI-2 case is exactly similar to the ORP-169A ORP meter case. Are these different devices? RU
3.7. DSI-2 began to behave differently than before !!! – 10.07.1515 ... Thank you very much)))) functioned. 13.07.15. RU
3.8. DSI-2 and IKAR work much more reliably. This Is My Opinion! RU
3.9. The output ORP does not match the declared one. Why has the ORP of the water produced by the 01m plant changed?? RU
3.10. Cleaning ORP meter (видео). RU

...Easy-to-use portable commercial devices (pencils) are made on the basis of electrodes, the production secrets of which are not disclosed. Calibration of such devices with standard solutions of red and yellow blood salt in the area of positive ORP does not provide any guarantee that the readings are correct in case of negative ORP. The use of platinum electrodes and standard reference electrodes (for example, silver chloride) guarantees the correct result at first sight.

However, the purity of the platinum electrode is of great importance here. The measured value is the potential difference between the two electrodes. The input resistance of the measuring circuit is large, but not infinite, it is usually 10^10 - 10^12 Om.

see. http://www.o8ode.ru/article/energo/ovp_water/oxy.htm RU

Part 1. ORP measurement

... It was found that the magnitude of the area of the electrodes, the "smoothness" of the surface, the treatment of the electrode before measurements, as well as the structure of the metal play a great role in measurements with platinum electrodes..

The larger the electrode area, the higher the processing purity, special methods of removing oxide layers are applied, the more sensitive the electrode to changes in the oxygen content in water and has a more negative potential value.

So, for example, we took a batch of 100 pieces of platinum laboratory electrodes of the EPL-02 type, manufactured at the Gomel ZIPP (Belarus), and carried out measurements in water with different oxygen content. Platinum at these electrodes is a ball with a diameter of about 1 mm, fused into the glass. The spread of potentials for such electrodes at the level of water having a potential of -200 mV was 150 mV. When viewing the surface of platinum under a microscope, it can be seen that the surface is uneven, pitted with pits that arose when platinum was processed in a gas burner.

Much better reproducibility is obtained if platinum is taken in the form of a polished wire with a diameter of more than 1.5 mm and a length of 2-3 mm or in the form of a disk with a diameter of 1 cm, electrodes from «YuMO» (Germany).

In addition to the quality of the platinum surface and its area, the processing of the electrode in some reducing solutions is important.

We analyzed the "quality" of platinum electrodes in portable ORP meters, usually made in China. Unfortunately, due to the economy of platinum (the cost of platinum is now almost 2000 rubles / g), all electrodes do not meet the above requirements for obtaining sufficiently reliable and reproducible results. Summing up, it can be argued to a large extent that in the absence of redox systems in water such as Fe^2 + / Fe^3 + the potential of the platinum electrode (ORP) is largely determined by the amount of dissolved oxygen.


An example of *incorrect* registration with two ORP meters from one batch of ORP: buffer solution **ORP_001=+281 mV, ORP_002=+289 mV**: water **activated** after installation **"IKAR" (mod.01os) ORP_001=+207 mV, ORP_002= - 251 mV**.

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