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COMPARISON OF BREATHALYZERS TYPES

Today's world is based on the development of science in general. Engineering is no less developed, in which cars, industrial or household appliances are created for human needs and so on. Many of these mechanisms require a person to observe safety regulations. Operating a technique of increased danger, for example, a car or a machine at a factory, a person should understand that it is responsible for accidents that can happen, and therefore you should always keep yourself in both physiological and psychological tone. Therefore, being sober in this situation is a necessary requirement for someone.

There are several classifications of breathalyzers.

Classification of breathalyzers by purpose:

- Professional breathalyzers - have the maximum frequency of use (from 200 to 300 times per day). In the configuration there are additional devices that are usually used in large enterprises and in the departments of the road transport service, for example, a printer that prints the results of analysis. They have a rather low error of results - 0.01 ppm.
- Special - not used as often as their professional relatives, about 10-30 checks per day. They are often used in small industrial enterprises, in medical institutions and in road inspection.
- Club - is used in many entertaining institutions, which is understandable on the basis of the name of the group. According to their characteristics they are mixes of the first types of alcohol testers;
- Individual devices are the simplest of all existing species, they can be used about 2 times a day. They are great for people who are worried about their safety and are not shy of such self-control.

Classification of breathalyzers by method of indication:

- Switchgear
- LED Light
- Digital

Classification of breathalyzers by type of sensor:

- Semiconductor, which burn alcohol vapors
- Electrochemical. Inside the sensor an electrochemical reaction occurs. There is a special reagent that reacts only with molecules of ethanol, with other substances the reaction will not occur. This is the most reliable type of sensor.
- Photometric, in which vapors of alcohol are absorbed by infrared radiation. Are the most accurate indicators. Do not wear out with time, but are the most expensive.

The comparisons were carried out according to the type of sensor. The evaluation criteria were the cost, response rate, the need for calibration, sensitivity to alcohol (measurement accuracy), depending on the ambient temperature.

The cost

Semiconductor breathalyzer is the cheapest of all. The second place on the price policy is occupied by the electrochemical. The most expensive is a photometric breathalyzer.

Response rate

Breathalyzer with semiconductor sensor has a relatively low speed. Breathalyzer with an electrochemical sensor has a high performance index. Photometric breathalyzer is inherent in long-term analysis. Warming up before work lasts about 20 minutes. Then, each measuring procedure takes up to 10 minutes.

The need for calibration

Breathalyzer with semiconductor sensor has low stability (requiring frequent calibration). Breathalyzer with electrochemical and photometric sensor type has high stability (do not require frequent calibration). Calibration interval of the semiconductor sensor is 6 months for breathalyzer with electrochemical and photometric sensor type - 12 months.

Sensitivity to alcohol (measurement accuracy)

Breathalyzer with semiconductor sensor has low selectivity towards ethanol. Breathalyzer with electrochemical sensor has high selectivity with towards ethanol, high sensitivity and accuracy. Breathalyzer with photometric sensor has absolute selectivity towards ethanol.

Depending on the ambient temperature

Indications of semiconductor breathalyzer and photometric sensors depend strongly on the ambient temperature. Indications of breathalyzer with electrochemical sensor are less dependent on the ambient temperature.

Conclusion

Taking into consideration all above mentioned we can state that the breathalyzer with an electrochemical sensor is the best of them. Maintaining the instrument does not depend on the ambient temperature, it has high accuracy and sensitivity to ethanol