

# SCIENTIFIC BASES OF METROLOGICAL SUPPORT OF MEASUREMENTS OF COMPOSITION AND PROPERTIES OF OIL

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## Abstract

In Uzbekistan, there are three oil refineries (refineries) - Ferghana, Altyaryk and Bukhara with a total capacity of 11.2 million tons. The refining capacities of the Ferghana and Altiaryk plants (the latter has a fuel and oil sector) amount to 8.7 million tons of oil and gas condensate refining. The Bukhara Oil Refinery produces high-quality gasolines, jet fuel, diesel fuel. The design processing capacity is 2.5 million tons of gas condensate per year.

**Keywords:** bargain price, accuracy, sensitivity, thermogravimetric, conductometric, dielcometric, Metrological support

## 1. Introduction

Oil reserves in Uzbekistan in 2011 were determined in the amount of 81 million tons. Oil production in Uzbekistan in 2017 amounted to 806 thousand tons. Oil fields in Uzbekistan are discovered in the territories of the Karakalpak Autonomous Republic, as well as in six administrative regions: Andijan, Bukhara, Kashkadarya, Namanga, Surkhandarya and Ferghana. Key reserves have been explored within the Kashkadarya region, and the largest oil fields in the country near Kokdumalak.

The design capacity of the Jizzakh refinery, provides for the processing of 5 million tons of oil per year, the production of 3.7 million tons of motor fuel, more than 700 thousand tons of aviation fuel and 300 thousand tons of associated petroleum products. Implementation of the project is calculated by 2022. The plant will operate on raw materials imported from Kazakhstan and Russia.

## 2. Theoretical and experimental research.

Izbaskent oil field - located in the eastern part of the Ferghana Valley. Andijan oil field - located in the eastern part of the Ferghana Valley. Boston is an oil field located in the eastern part of the Ferghana Valley. Palvantash is a gas and oil field located in the eastern part of the Ferghana Valley, near the village of Palvantash, Markhamat district (Andijan region) on the shore of the South Ferghana Canal.

Tavakkal - gas condensate field is located in Kashkadarya province. Khujum - gas condensate field is located in Kashkadarya region. Shakhpakhty is a gas condensate field located in the southeastern part of the Ustyurt plateau in the Kungrad region. South Alamyshik is an oil field located in the eastern part of the Ferghana Valley on the southern side of the depression. Nearby is the village of the same name located on the territory of the Jalakuduk district (Andijan region, Uzbekistan) on the banks of the Kartal canal.

Gas content is found in Jurassic sediments. Initial reserves of natural gas amount to 202 billion cubic meters, and oil - 6 million tons.

The operator of the field is the Russian oil company Lukoil (90%). The remaining 10% is from the Uzbek oil company Uzbekneftegaz.

Kandym-Khauzak-Shady is an oil and gas project in Uzbekistan. The initial reserves of the project amount to 93.23 million tons of oil. Project gas production should be 11 billion m<sup>3</sup>. The project includes such oil and gas fields as Kandym and Khauzak-Shady. Currently, there are a large number of methods for determining moisture. In the modern world, the quality of products determines the competitiveness of the enterprise, its sustainable development.

The oil was previously shaken. Crude oil, 60 ml (a minimum division of 50 ml, plus two divisions - 10 ml) was poured into a measuring cup. Further, the oil was poured into an evaporation flask installed in the left heating bowl.

After that, a measuring trap was installed in the flask. Then, the power of the left heater was turned on by switching the corresponding toggle switch and the heater voltage was set in the interval between 70-100 V using the control knob.

After boiling the liquid, followed by pops and sudden bursts, the voltage on the heater was reduced to about 50 V, and then it was regulated in accordance with the dropping rate in the refrigerator (2-5 drops per second). The experiment was carried out until the formation of droplets in the refrigerator stopped. The low temperature in the refrigerator was maintained by periodically incorporating running water into the cooling circuit.

Quality is the main factor in the sale of goods at a bargain price. Ensuring the quality of products and services is the main goal of metrology, standardization and certification. The scientific basis of metrological support is metrology - the science of measurements, methods and means of ensuring their unity and ways to achieve the required accuracy, which includes three components: theoretical, legislative, and practical (applied) metrology.

**3.Methodology**

The following main tasks are solved within the framework of theoretical metrology:

- Creation and improvement of the theoretical foundations of measurements and measuring equipment;
- Creation and improvement of the theoretical foundations of a system for reproducing, storing and transmitting units of quantities;
- development of optimal principles, techniques and methods for processing measurement results;
- carrying out theoretical and experimental studies with the aim of improving existing measurement methods and SI, as well as developing new measurement principles and means of measuring equipment;
- development of scientific and methodological foundations of metrological support of measurements.

However, there is no consensus on the superiority of one of them over the others. In this regard, almost all manufacturers of moisture meters known on the world market during the development try to cover several measurement methods in their production.

This is due to the extremely large number of heterogeneous materials, the humidity of which must be controlled, the ranges of the measured values, the required accuracy, speed and design. Nevertheless, the analysis of the produced moisture meters made it possible to single out the group of methods that were most widely used.

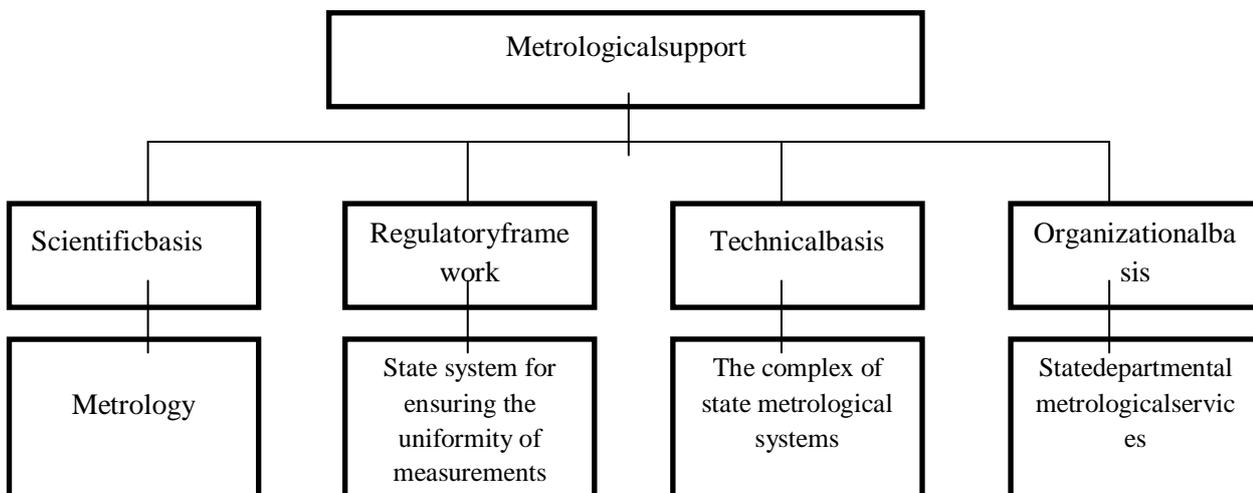
These include: conductometric, dielcometric, infrared (IR or thermogravimetric), the method of spectrum analysis in the IR range, as well as the method of superhigh frequencies (microwave). Metrological support for measuring the composition and properties of oil plays an important role. To ensure accuracy and sensitivity of measurement results.

Metrological support for measurements of the composition and properties of oil and oil products.

By ensuring the uniformity of measurements is understood the activity aimed at establishing and applying the scientific, legal, organizational and technical foundations, rules, norms and means necessary to achieve a given level of measurement uniformity.

The scientific basis of metrological support is metrology -

the science of measurements, methods and means of ensuring their unity and methods of achieving the required accuracy.



**FIGURE 1.1** - The structure of metrological support of measurements

The regulatory framework is the State system for ensuring the uniformity of measurements (GSI), which is a set of regulatory documents that establish the rules, norms, requirements aimed at achieving and maintaining the unity of measurements in the country, approved by the Agency for Technical Regulation and Metrology of the Republic of Uzbekistan.

In accordance with the objects of the ICG are:

- units of physical quantities;
  - state standards and all-Union calibration schemes;
  - methods and means of verification of measuring instruments;
  - nomenclature and methods of standardization of metrological characteristics of measuring instruments;
  - norms of accuracy of measurements;
  - methods of expression and presentation of the results and indicators of measurement accuracy;
  - measurement techniques (methods);
  - methods for assessing the reliability and presentation of data on the properties of substances and materials;
  - requirements for standard samples of the properties of substances and materials;
  - terms and definitions in the field of metrology;
  - organization and procedure for testing measuring instruments, verification and certification of testing equipment; calibration of measuring instruments, metrological examination of regulatory, technical, design, engineering and technological documentation, as well as examination and data on the properties of materials and substances used.
- Thus, it is obvious from a number of considered examples that for the implementation of the Energy Strategy of the Republic of Uzbekistan, metrological support for accounting for oil and oil products is an urgent problem, further scientific research and methodological study of these issues are required.

## 5. Conclusion

The water layer, which is extracted along with the oil, and the salts dissolved in it (especially chloride salts) corrode pipelines, tanks, and oil refinery equipment. Therefore, the field oil preparation system is a key element of oil field operation technology.

The process of oil and gas preparation in a field involves the measurement, collection, separation, dewatering, desalination, stabilization, and separation of mechanical product from the well product.

In order to solve the problem of oil production at the field, complex engineering structures will be built at the field. The system of collection and preparation of oil, gas and water requires knowledge of the physical properties of oil, gas and water, calculation of technological processes, justification of the choice of equipment and determination of the procedure for their use.

This manual covers the classification of pipes used in the collection, preparation and transmission of oil, gas and water in fields; oil and gas preparation equipment; long-distance transmission of oil and gas; methods of calculation of oil and gas pipelines; pumping stations in liquid main pipelines; detailed information on compressor stations in natural gas transmission pipelines.

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