



ROLE OF COMPARISON, CALIBRATION AND METROLOGICAL CERTIFICATION IN ENTERPRISES

Badalov Nomoz Jo'raboyevich

Jizzakh Polytechnic Institute, Acting Associate Professor,

Phone Number: +998903110662

nomozbadalov@gmail.com

ANNOTATION

Determining the errors of benchmarking instruments and determining their applicability. Calibration is a set of operations that determine the ratio between the values of quantities obtained using calibrated measuring instruments under certain conditions and the corresponding values that can be reproduced with standard measuring instruments and standards. Metrological certification of test instruments is confirmation of the reproducibility of the test conditions within the limits of deviation and determination of the suitability of the test instrument.

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In the years of independence, in a short period of time, as a national office for metrology, which implements the requirements of quality and safety of products, services and processes, measurement methods, qualified experts, in short, the agency of technical regulation of the Republic of Uzbekistan, based on the requirements of national legislation, provides a single unit. The development of society is closely related to the history of the emergence and development of measurement culture. This relationship is the process of continuous improvement of measurements, measurement tools and the system of ensuring the unity of measurements. The development of society consists of the path traveled from simple measurements to the scientific basis of measurements through their sense organs and a certain level of experience. The most basic part of modern metrology, that is, the science of measurements, is to teach the unity of measurements with the help of its methods and tools and the ways to ensure it with the required accuracy. The essence and importance of measurements in metrology is incomparable in the development of science and technology and opens wide opportunities in solving problems related to it. Extensive work in the field of measurement shows that its role in science and technology and in the life of human society is extremely high. The development of





society is determined by the state and capabilities of measurements and its metrological support. Ensuring the unity of measurements is one of the most urgent issues of metrology. Any measurement information obtained as a result of measurements will be more important and useful only if it meets the requirement of ensuring the unity of measurements with the required accuracy. Many scientists have overestimated the importance of measurements.

For example, great scientists in metrology said: "Any science begins with measurement, exact science cannot be imagined without measurement", "Anything is determined by the degree to which it is measured", "Measure what can be measured, and create a possibility for what is impossible."

In order to carry out the comparison of measuring and testing tools, it is necessary to establish a procedure or system for transferring the size of the unit of physical quantity from the state standard or the initial sample measuring tool to the working measuring tools. It is necessary to define such a system by means of comparison schemes, representing a document approved in the established order, which regulates the means, methods and accuracy of transferring the unit measurement from the standard or the initial measuring instrument to the working measuring instrument. It is important to develop standards and methodologies for the creation of local comparison schemes and the methods and tools for comparing standard and working measurement tools. The elements of the international comparison scheme are all standards, standard measuring instruments and working measuring instruments, as well as methods of unit measurement transmission. The elements of the local comparison scheme are sample measuring instruments, working measuring instruments, as well as names of comparison methods. It is allowed to enter the names of duplicate standards and working standards in comparison schemes. In the comparison scheme, as a rule, only one physical unit of measurement should be indicated. Interstate comparison schemes for measuring instruments of physical quantities are developed by the main center of state standards, which is considered to be the keeper of the state standard of this unit of size [1].

One of the forms of metrological control is the comparison of measuring instruments. Comparison of measuring instruments is defined by the metrological office as determining the errors of measuring instruments and determining their applicability. Measuring instruments performed in accordance with the requirements of regulatory documents are recognized as suitable for comparison methods and tools. State standards of methods and means of comparison of working and standard measuring instruments should be performed in accordance with the requirements of the state system standard. The standards of comparison methods and tools should include the





necessary minimum metrological parameters that are sufficient to solve the question of the suitability of the comparative measuring tools, which should be compared and which provide the most efficiency of the comparison work at the lowest costs.

The methods of comparison specified in the standards should be in accordance with the methods provided for in the national standards, which are compatible with the schemes of international comparison. In the standards of comparison methods and tools, it is important to use the comparison tools whose requirements are specified in the state standards that apply to measuring and testing instruments, or which have passed the state test and are included in the state register. The name of the comparison method and means should consist of the name of the standard complex of the state measurement system to which it belongs, the name of the object of standardization and the name of its type. For example: "State system of ensuring the unit of measurements" in production enterprises. Methods and tools of comparison." The standard introduction and includes the following sections: comparison operations, comparison tools, comparison conditions, preparation for comparison, carrying out comparison, processing of observation results, formalization of comparison results.

In production enterprises, it is indicated what the standard applies to, that is, it is indicated that the measuring instruments are named and their normative technical specifications, and it establishes the methods and means of their comparison. The section "Comparison operations" should contain a list of names of operations that should be performed during the comparison, that is, the comparison operations are shown in a sequence that is more appropriate to conduct the comparison process. The section "Measurements of comparison" should include a list of physical quantities that affect the metrological parameters of the measuring instruments being compared [2]. Examples of affected quantities are ambient air temperature, humidity and pressure, temperature, pressure and physico-chemical properties of the environment used during comparison, power supply frequency and voltage, vibration and shock, magnetic and electric fields, harmonic content, free fall acceleration, etc. will be The section "Preparation for comparison" contains a list of preparatory work to be carried out before carrying out the comparison and the methods of their execution (setting the instruments to zero, durability of the instruments being compared, washing, wiping oil, heating.). The "Comparison" section should include the sub-sections of external inspection, testing, determination of metrological parameters. In the section "Processing the results of observations", the methods of processing the results of observations should be included in the standard. In the section "Regulation of the results of observations", it is very important that the measurement tools include the





requirements for the registration of the results of state and departmental comparisons. Positive results of the comparison are formalized by stamping and issuing a certificate of comparison, in the case of negative results, the stamps are canceled and information is given about the invalidity of the instrument.

During the comparison of measuring instruments, an application for comparison, measuring instruments and operational and technical documentation of measuring instruments are submitted to the executive. The executive examines the application within one working day and concludes a contract with the applicant for the comparison of measuring instruments, and in the event that the comparison is not possible, he sends a letter to the applicant indicating the reasons for the refusal to carry out the comparison. Contracts for the comparison of measuring instruments can also be concluded electronically. The duration of comparison of measuring instruments should not exceed ten working days, with the exception of measuring instruments for which the norm of the comparison time exceeds the specified period in accordance with the requirements established in the normative documents in the field of technical regulation.

Rules for calibration of measuring instruments In accordance with the Law of the Republic of Uzbekistan "On Metrology", the procedure for organizing and conducting calibration of measuring instruments is established. The applicant is a legal or natural person interested in calibration of measuring instruments, the executive is an accredited metrology service, calibration of measuring instruments under certain conditions, determining the metrological characteristics of measuring instruments by determining the ratio between the value of the quantity obtained using the measuring instrument and the value of the corresponding quantity restored by the standard a set of operations performed in order to [3].

Calibration is carried out in order to determine the metrological characteristics of measuring instruments by carrying out a set of operations that determine the ratio between the values of quantities obtained using calibrated measuring instruments under certain conditions and the corresponding values restored by standard measuring instruments and standards. Standard measuring instruments, standards and auxiliary calibration instruments with direct or indirect metrological traceability to the units of the international system of units are used in the calibration of measuring instruments. The periodicity of calibration of measuring instruments is defined in the calibration methods and procedures, in which the specified period should not exceed the period of the intercomparison interval of the corresponding measuring instruments. In the process of calibration, it is recommended to use the methods published in the normative documents in the field of technical regulation or





described in the authoritative technical organization or relevant scientific articles or magazines or recommended by the manufacturer of the measuring instrument.

Calibration methods with sufficient and clear information on how to perform the calibration should not be supplemented or rewritten in the form of internal procedures if the method is written in such a way that it can be used by the personnel of the calibration laboratory. . Calibration of measuring instruments is carried out in the form of documented information of management systems in accordance with the calibration procedure. Calibration laboratories develop a calibration procedure based on calibration and measurement capabilities for documentation or further clarification of the sequence of actions in the calibration method. The results of calibration of measuring instruments performed by an accredited metrology service can be used for comparison of measuring instruments. Calibration of measuring instruments is carried out by employees of the calibration laboratory who are competent in the specific field of accreditation. The fee for calibration of measuring instruments shall be paid by the applicant in accordance with the terms of the contract [4].

During the calibration of measuring instruments, review the applicant's application for the calibration of measuring instruments, determine the technical possibilities of calibration in accordance with the customer's requirements and select sample measuring instruments and auxiliary calibration instruments to ensure certain metrological specifications, check the compliance of the measuring instrument with operational documents, perform measurements, and determine the uncertainty of the measurement results. processing of level assessment, formalization of calibration results, submission of documents on measuring instrument and calibration results to the applicant. The application for calibration of measuring instruments shall be accompanied by operational documents specifying the measuring instrument and the metrological characteristics of the measuring instrument.

The list of metrological characteristics of measuring instruments that must be determined during the calibration process, and, if necessary, the calibration conditions and methods for determining these characteristics. Calibration of measuring instruments is carried out in stationary calibration laboratories, mobile calibration laboratories, directly in the places where measuring instruments are located, by sending experts on a business trip. The procedure for sending specialists on a business trip, using mobile calibration laboratories, and organizing work is determined by the contract. If necessary, based on the application of the applicant, calibration of measuring instruments can be carried out in the places of their preparation, wholesale storage, repair or use of measuring instruments. In the event





that the calibration of measuring instruments is carried out at the place of use, the applicant ensures that the calibration and auxiliary equipment belonging to the performer who performs the calibration is delivered to the place of calibration and back to its place, allocates the necessary rooms and auxiliary personnel for carrying out the calibration, provides all the conditions for carrying out quality calibration work, in the case of on-site calibration of measuring instruments, it ensures the storage of calibration and auxiliary tools belonging to the performer performing the calibration, when using a mobile calibration laboratory, it ensures its connection to engineering communications, provides a place for it to stand, and also ensures its storage [5].

The executive examines the application within one working day and concludes an agreement with the applicant on the calibration of measuring instruments or, in the event that it is not possible to carry out the calibration, sends the applicant a letter stating the justified reasons for refusing to carry out the calibration. Contracts for calibration of measuring instruments can also be drawn up in electronic form. Calibration of measuring instruments is carried out within ten working days from the date of payment based on the contract concluded by the executor for calibration of measuring instruments. The performer guarantees the accuracy of the results only during the calibration. From the moment the measuring instruments are handed over to the applicant, the metrological specifications of the executive measuring instruments do not meet the requirements of the normative document in the field of technical regulation. It is up to the applicant to decide on the applicability of the measuring instrument. In case of reasons that do not allow calibration, the executive will provide the applicant with a document indicating the reasons for not being able to carry out calibration. The results of measurements carried out in the process of calibration of measuring instruments, their processing and assessment of their uncertainty, are recorded in calibration reports and certificates in the form specified in the calibration procedure. The requirements for the content of the calibration certificate of the measuring instrument are defined in the regulatory documents in the field of technical regulation. When errors are found in the calibration certificate or report, full re-registration of certificates and reports is carried out in the prescribed manner [6].

Rules for passing metrological certification of test instruments in accordance with the Law of the Republic of Uzbekistan "On Metrology", the procedure for organizing and conducting metrological certification of test instruments applies to test instruments used in the field of implementation of state metrological inspection and control. Metrological certification of test tools used in the fields of health, veterinary,





environmental protection, accounting of material wealth and fuel and energy resources, tax, customs, trade, post and telecommunications. in the storage, transportation and destruction of toxic, flammable, explosive and radioactive substances, in the production, sale and provision of services, protection of the population and territories from natural and man-made emergency situations, ensuring fire safety, safety of people in water bodies, industry ensuring safety, ensuring state defense, ensuring labor safety and traffic safety, determining the safety and quality of certified products, performing geodetic, cartographic and hydrometeorological work, conducting state testing, comparison, calibration, repair and metrological attestation of measuring instruments, extracting minerals, it is carried out when conducting official sports competitions, when performing work on assessing the conformity of products and services. The main purpose of metrological certification of test tools is to confirm the reproducibility of the test conditions within the limits of permissible deviations and to determine the suitability of the test tool for its intended use. The applicant is a legal or individual interested in conducting metrological attestation of test instruments, the executive is considered to be a set of accredited metrology services, test conditions, influencing factors in the testing process, or a set of operation modes of the object [7].

Confirmation of the conformity of the specifications of the test equipment to the technical documents after the removal of the primary production, importation or repair, as well as during the commissioning and preparation for use of the test equipment after installation, at the end of the interval time specified in the operational documents of the periodic certification test equipment or during its primary metrological certification for the purpose of extraordinary attestation, when the seal confirming the passing of the certification of test instruments is broken, when the document confirming that the test instrument has passed metrological certification is lost, or when it is necessary to perform adjustment work, as well as when putting the test instruments into use after long-term storage, the use of test instruments during the implementation of state metrological control of inspection attestation in cases where it is necessary to determine the validity of the expert certification test tools or their validity is held in case of controversial issues regarding compliance with standard technical specifications [8].

The primary metrological attestation is the ability to independently restore the external influencing factors specified in the test methodology documents of a specific type of product or the operating modes of the test object, the deviation of the parameters of the test conditions from the indicators specified in the requirements of the normative document in the field of technical regulation, ensuring the safety of





employees and the absence of harmful effects on the environment. will be held. The list of equipment descriptions to be checked during periodic metrological attestation, as well as the methods, tools and periodicity of their use, periodic attestation is carried out in the process of using test equipment, in the volume necessary to confirm the compliance of its descriptions with the requirements of test methodology documents and operational documents. Expert attestation of test tools can be carried out based on the decision of the investigation, inquiry, investigation, prosecutor's office or court.

LIST OF REFERENCES

1. Juraboevich B. N. Products in Manufacturing Enterprises the Essence of Quality Management //International Journal of Development and Public Policy. – 2021. – Т. 1. – №. 5. – С. 117-118.
2. O'g B. O. N. et al. THE ROLE OF QUALITY MANAGEMENT SYSTEM IN INCREASING PRODUCT QUALITY IN ENTERPRISES //Web of Scientist: International Scientific Research Journal. – 2021. – Т. 2. – №. 12. – С. 228-233.
3. Бадалов Н. Ж., Бердимуродов Г. Т., Бадалов У. Н. СИФАТЛИ МАХСУЛОТ ИШЛАБ ЧИҚАРИЛИШИДА СИНОВ ВА ЎЛЧОВЛАРНИНГ АХАМИЯТИ //Ижтимоий Фанларда Инновация онлайн илмий журнали. – 2022. – Т. 2. – №. 1. – С. 101-106.
4. Бадалов Н. Ж., Бадалов У. Н. КОРХОНАЛАРДА МАҲСУЛОТЛАР СИФАТИНИ БОШҚАРИШНИНГ АСОСИЙ ФУНКЦИЯЛАРИ //Academic research in modern science. – 2022. – Т. 1. – №. 1. – С. 38-45.
5. Jo'raboevich B. N. QUALITY EXPORT PRODUCTS IN ENTERPRISES GENERAL AND SPECIAL IN PRODUCTION IMPORTANCE OF REGULATIONS //ResearchJet Journal of Analysis and Inventions. – 2022. – Т. 3. – №. 06. – С. 18-24.
6. Jo'raboevich B. N., Ikramovich I. D., Nomozovich B. U. SINOV VA KALIBRLASH LABORATORIYALARIDA KOMPETENTLIGINI XALQARO DARAJADA OSHIRISH OMILLARI //E Conference Zone. – 2022. – С. 128-131.
7. Jo'raboevich B. N., Ikramovich I. D., Nomozovich B. U. SIFAT MENEJMENT TIZIMINING-SINOV VA KALIBRLASH LABORATORIYALARIDAGI O 'RNI //E Conference Zone. – 2022. – С. 67-71.
8. Jo'raboevich B. N. QUALITY EXPORT PRODUCTS IN ENTERPRISES GENERAL AND SPECIAL IN PRODUCTION IMPORTANCE OF REGULATIONS // Research Jet Journal of Analysis and Inventions. – 2022. – Т. 3. – №. 06. – С. 18-24.

