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DETERMINATION OF THE SIZE OF THE GAUGE BLOCK BY THE ABSOLUTE MEASUREMENT METHOD

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The unity of measurements is the state of measurements in which the results of these measurements are expressed in units of quantities approved for use in the Republic of Belarus, metrological traceability is ensured, and measurement accuracy indicators do not exceed the established limits with a given probability. Reproduction, storage and transmission of unit sizes is carried out measurement standards [1].

Ensuring the uniformity of measurements contributes to the elimination of technical barriers to trade, increases the competitiveness of products, works and services, guaranteeing the reliability of information about their characteristics and effectiveness. Currently, the measurement standard base of the Republic of Belarus consists of 64 national standards. The development of the national measurement standard base and its maintenance at a high international level is part of the state policy in the field of scientific, scientific, technical and innovative activities. Within the framework of the "Standards of Belarus" subprogram of the State Scientific and Technical Program "National Standards and High-tech research Equipment" for 2021-2025, work is underway to modernize and create new standards and units of quantities [2].

The meter is one of the seven basic units of measurement adopted in the International System of Quantities. The definition of a meter as a unit and its physical implementation have changed over time. The first standard of the meter was a platinum - iridium bar, the unit of length - meter was determined by the distance between the axes of the two middle strokes applied on the bar. In 1895,

the II General Conference on Weights and Measures recognized that the wavelength of monochromatic light can be a natural witness to the size of a meter. Later, the definition of a meter was adopted: "A meter is a unit of length equal to the path traversed in vacuum by light in 1/299792458 fraction of a second". At the primary level, the meter is reproduced as a wavelength using iodine-stabilized helium-neon lasers. At sublevels, material measures are used, and traceability is verified by means of optical interferometry.

Gauge blocks were proposed in 1898 by C.E. Johansson as composite gauges for controlling the dimensions of machine parts. Despite their simplicity, gauge blocks became a significant invention at that time and is still widely used today, because they are the only accurate material carriers of linear dimensions.

Currently, the reproduction of a unit of length - a meter is due to the use of various radiation sources, the wavelength of which is known with a certain accuracy. In practice, gas-discharge lamps filled with the following gases and metals in a gaseous state can be used as radiation sources: helium He, krypton Kr, iodine I or cadmium Kd. The gauge block is made in the form of a rectangular parallelepiped with a normalized size between the measuring planes. The absolute measurement method consists in comparing the length of the end measure with the wavelength of the radiation source, which is a fundamental physical constant.

References

1. Law of the Republic of Belarus No. 3848-XII of September 5, 1995 "On ensuring the unity of measurements" (as amended. Law of the Republic of Belarus dated 11.11.2019 No. 254-Z).

2. List of state and regional scientific and technical programs for 2021-2025. (approved by postan. Of the Council of Ministers of the Republic of Belarus No. 173 dated 26.03.2021).