УДК 006.91+53.08

SCIENTIFIC AND METHODOLOGICAL SUPPORT OF METROLOGICAL TRACEABILITY A LENGTH UNIT – A METER

Graduate student Volchok O.P.
scientific supervisor – PhD in Philology, associate professor Khomenko E.V.
Belarusian National University of Technology
Minsk, Belarus

Metrological traceability is a property of a measurement result, according to which this result can be correlated with a national measurement standard of a quantity unit or another basis for comparison through a documented unbroken chain of verifications and (or) calibrations [1]. Etalon is a measuring instrument (or a set of measuring instruments) that provides reproduction and (or) storage of a unit, as well as the transfer of its size to the measuring instruments lower in the verification scheme and approved as a standard in the prescribed manner.

Metrological traceability is an essential condition for ensuring the uniformity of measurements. One of the main principles for ensuring the uniformity of measurements is the metrological traceability of measurement results to units of the International System of Quantities, primarily reproducible by national measurement standards. Methods for ensuring metrological traceability have been extended to international standards of units of quantities and standards of foreign countries, including the bases for comparison, reproducible by standard samples and reference (primary) measurement methods (methods). Ensuring the uniformity of measurements in the country contributes to obtaining correct and accurate measurement results both for solving domestic issues and for supporting the export of domestic products.

According to the BIPM, OIML, ILAC and ISO Joint Statement on Metrological Traceability: metrological traceability is one of the elements that

provides international confidence in the equivalence of measurements and thus largely removes technical barriers to trade.

The main issues of realization of the unit of length – meter with the use of absolute physical constants are considered. An analysis of ensuring the traceability of a length unit was carried out. Taking into account the relevance of the use of laser radiation sources to ensure the traceability of a length unit, an analysis of the existing and new traceability schemes was presented. The issues of creating methodological support for the analysis and processing of measurement results were considered.

At the primary level, the meter is reproduced as a wavelength using iodine-stabilized helium-neon lasers. The sublevels use material measures such as gauge blocks and traceability is verified by means of optical interferometry to determine the length of the gauge blocks when the length mentioned above is taken as a reference value. End measure of length is a standard measure of length, made in the form of a rectangular parallelepiped with a normalized size between the measuring planes. The absolute method of measurement is to compare the length of the gauge block with the wavelength of the radiation source.

Until now, gas discharge lamps filled with the following gases and metals in the gaseous state (helium He, krypton Kr, iodine I or cadmium Kd.) can be used as radiation sources on standards intended for measuring the length of end measures. The use of laser sources of radiation to determine the length is a priority in metrology at the present time.

References

1. LAW OF THE REPUBLIC OF BELARUS dated September 5, 1995 No. 3848-XII «On Ensuring the Uniformity of Measurements».