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## **DEVELOPMENT AND TRANSFORMATION OF NATIONAL METROLOGY LEGISLATION IN UKRAINE**

*This paper describes main components of modified National System of Metrology in Ukraine. Set out the content new legislation, foundations for harmonization of national normative documents in field of metrology and principal of implementation of European Directive on Measuring Instruments in accordance to modules of the conformity assessment of measuring instrument in Ukraine.*

**Keywords:** *legal metrology, measuring instrument, harmonization, normative document.*

### **Introduction**

Modern metrology is distinguished by a close collaboration and cooperation of all the countries throughout the world, since they could not settle the tasks in metrology separately from each other. Metrology is a discipline in which the key element is a high degree of international, regional and national coordination [1 – 4].

With growth of globalization and regionalization trade and economy new requirements arise up before national metrological infrastructures which must be resulted in accordance with the modern requirements. In fact, these tasks are directed at achieving an acceptable level of satisfaction on the part of society, industry and the scientific community. However, development of coordination of the concepts of legal, fundamental and industrial metrology on national level, together with their requirements and procedures is a difficult and lengthy process.

For the Global Metrology System to function effectively, above all harmonization is required at the national level of legislation in the field of metrology on the basis of the relevant documents, Recommendations and standards of the various international organizations involved. The International Organization of Legal Metrology (OIML) was established in order to promote the global harmonization of legal metrology procedures. OIML International Document OIML D1 «*Elements for a Law on Metrology*» [5] is particularly instrumental in this. From January 1997 Ukraine has become the OIML Corresponding Member [6, 7].

Necessary transformation of national metrological legislation with the purpose of adaptation of National Metrology Service with the modern requirements of effective activity in framework of Global Metrology System is an important and difficult task.

### **1. National metrology legislation**

On Ukraine's gaining the independences in 1992 by a Decree of the Cabinet of Ministers of Ukraine «*On traceability assurance*» (no. 40-93 of 26.04.1993) has been established legislative basis of the State Metrology System and the State Committee of Ukraine for Standardization, Metrology and Certification (Derzhstandard, DSTU) with traceability assurance as one its responsibilities.

In 1996 has developed draft the Law of Ukraine «*On Metrology and Metrological Activities*», which highlighted all major aspects of the organization and management of metrological activities and was accepted of Verkhovna Rada of Ukraine (national Parliament) as Ukrainian Law in 1998. The content of this Law has harmonized with the guidelines of OIML International Documents, such as OIML D1 «*Law on metrology*» (1975), OIML D3 «*Legal qualification of measuring instruments*» (1979), OIML D12 «*Fields of use of measuring instruments subject to verification*» and other relevant documents» (1985) [6, 7].

The modern legislative basis of the National (State) Metrology Service of Ukraine includes of the Law of Ukraine «*On Metrology and Metrological Activity*» (no 113/98 of 11.02.1998) in edition Law of Ukraine (no 1765-IV of 15.06.2004). This Law on measuring units, standards and measuring instruments (MIs) which present-day activities of the State Metrology Service are based. The main provisions of the Law are harmonized with norms and rules on metrology, with OIML documents, which are generally accepted in the world practice [8, 9].

Derzhstandard was transformed in State Committee of Ukraine for Technical Regulation and Consumers' Police (Derzhspozhyvstandard, DSSU) in 2000. From 2011 of his functions in field of metrology were transferred in Department of Technical Regulation (DTR) of Ministry of Economic Development and Trade of Ukraine (MEDT).

From 2011 developing new draft of the Law of Ukraine «*On Metrology and Metrological Activities*», which is planning to accept as the Law of Verkhovna Rada of Ukraine in 2012. For the expert estimation of new draft of Law the European experts are involved.

## 2. National metrological organizational structures

The State (National) Metrology Service (NMS) of Ukraine comprises: DTR of MEDT, State Scientific Metrological Centers (SSMC), the Service of Uniform Time and Etalon Frequencies (SUTEF), the Service of Reference Materials for the Composition and Properties of Substances and Materials (SRMCP), the Service of Standard Reference Data on Physical Constants and Properties of Substances and Materials (SSRD), metrological centers and regional bodies (Figure 1) [10, 11].

The main objectives of DTR of MEDT are focused on the implementation of common scientific and technical policy in the field of metrology including:

- organizing and carrying out of fundamental research in the field of metrology;
- organizing and development of national measurement standards;
- determination of procedures for development, approval, registration and maintenance of measurement standards, as well as their comparisons with national and international measurement standards;
- determination of general metrological requirements to MIs, equipment and measurement procedures;
- type approval of MIs;
- determination of general requirements for verification, calibration and metrological evaluation of MIs;
- participation in cooperation projects with international organizations.

The main SSMC in Ukraine are State Enterprise «All-Ukrainian State Scientific and Research Centre of Standardization, Metrology, Certification and Consumer Protection» (SE «Ukrmetrteststandard», Kyiv) and National Scientific Centre «Institute of Metrology» (NSC «IM», Kharkiv).

SE «Ukrmetrteststandard» is designated as a leading Centre of the NNS of Ukraine and performs the following:

- carries out of development, maintenance and improvement of measurement standards;
- maintenance of the National register of approved types of MIs;
- state testing of measuring instruments in allocated fields of measurements;

verification and metrological certification of MIs in allocated fields of measurements;

developing of normative documents in the field of legal metrology (testing for type approval and verification of MIs, etc.).

The NSC «IM» is a leading centre for assuring the uniformity of measurements in Ukraine and:

carries out of fundamental and applied research in the field of metrology;

organizing of development, maintenance and improvement of national and secondary measurement standards used in traceability schemes;

state testing of MIs in allocated fields of measurements;

verification and metrological certification of MIs in allocated fields of measurements;

developing of normative documents in the field of metrology.

The main objective of metrological centers and regional bodies are initial verification, re-verification and metrological certification of MIs, realization of SMS in allocated regions.

## 3. The scope of activities of the National Metrology Service

The State Metrological Control and Supervision (SMCS) are exercised by the NMS in accordance to a procedure laid down by DTR of MEDT [10, 11].

Objects of the SMCS concerning enterprises and citizens as business entities are:

- MIs and measurement data acquisition systems;
- measurement methodology and normative documents specifying the requirements to measurements;
- packed products during packaging and selling;
- other objects envisaged by the metrological regulations and rules.

The State Metrological Supervision (SMS) covers measurement results of which are used for:

- diagnosis and curing of human illnesses;
- quality inspection of drugs;
- quality and safety inspection of foods;
- environmental inspection;
- job safety inspection;
- geodesic and hydro meteorological works;
- trade and commercial operations and settlements between a purchaser (consumer) and a seller (supplier, manufacturer, executor) including the fields of personal and public services, telecommunications and postal services;
- fiscal, banking and customs operations;
- record of energy and materials resources (electrical and heat power, gas, water, oil products, etc.) except internal records as being made by enterprises, organizations and citizens as business entities;

works which are carried out on the instructions of the court's bodies, public prosecutors' office, arbitration court and other public bodies;

mandatory product certification;  
registration of national and international records.

The following types of the State Metrological Control (SMC) are established:

state tests and type approval of MIs;  
metrological certification of MIs;  
verification and re-verification of MIs;  
accreditation for the right to carry out state tests, verification of MIs, perform measurements and carry out certification of measurement procedures, etc.

MIs intended for serial production or for importation in batches in Ukraine are subject to state acceptance and inspection tests with the type approval. Approved types of MIs are entered by DTR of MEDT into the State register of MIs authorized for use in Ukraine. MIs which are not subject to state tests, and which fall within the scope of the SMS are subject to the metrological certification.

MIs which fall within the scope of the SMS, and which are in operation, turned out of production, repair and released for sale, hired out, imported in Ukraine are subject to the verification.

In Ukraine obligatory condition for type approval and verification and re-verification intervals for the most wide-spread MIs are such [10, 11]:

trade scales – 1 year;  
gas counters – 5 years;  
water counters – 2 year;  
heat counters – 2 year;  
electric meter – 8-16 years;  
taximeters – 1 year;  
noise meters – 1 year;  
gas analyzers – 1 year;  
glass medical thermometers – ∞;  
tonometer's – 1 year;  
fuel dispensers – 1 year;  
manometers – 1 year;  
dosimeters – 1 year;  
alcoholmeters at exhalation – 1 year;  
instruments for checking a velocity – 1 year.

#### **4. The main ways of transformation of national metrology legislation**

The NMS legislative basis, it's rules, technical and organization basis in Ukraine are defined by the Ukrainian Law on metrology. The harmonization of activity of the NMS to requirements of international standards, guides and recommendations in the field of metrology is a very complicated task not only due to differences in economic development, but due to

distinguishes in national legislation ideology and structure [11, 12].

The approach of national metrological legislation to the international norms and practice is complicated by several factors, such as difficulty of the metrology system model selection, uncertainty in the selection of documents adaptation sequence, limitations of forms of practical implementation, problems with inadequacy terms and definitions, etc.

The conception of new draft of Ukrainian Law on metrology should take in account a necessity of gradual, step by step implementation the changes to the metrology regulation to avoid the unpredictable negative after-effects. As the result of implementation this Law the conceptions of calibration, traceability of measurement and metrological conformity should be implemented to the metrological practice in compliance with international documents, vocabularies and standards definitions [13, 14].

The implementation in Ukraine the requirements of European Directive 2004/22/EC on measuring instruments (MID) [16] declared as a basis for transformation the regulation for measuring instruments legal metrological control. The conceptions calibration, traceability of measurement and metrological conformity are implemented to the metrological practice in compliance with International Vocabulary of Metrology (VIM), International Standard ISO/IEC 17025 definitions [13, 16].

On 5 June 2014 the Parliament of Ukraine adopted new important legal acts – “*Law on Metrology and Metrological Activity*” (no. 1314-VII at 05.06.2014). The adoption of these laws signifies a major breakthrough in the modernization of the Ukrainian technical legislation and its alignment to the World Trade Organization and the EU requirements. The new Law aims at creating an effective and transparent metrology system in Ukraine. New legislative ground will carry out metrological activity in Ukraine on the basis of international and European requirements (e. g., OILM D1 document, acts of the EU acquis communautaire, and WELMEC). Clear delineation of administrative and commercial metrological services will contribute significantly to the elimination of corruption-inducing conflicts of interest.

Main components of national metrological legislative are such:

organization structure;  
equipment subject of national control;  
type approval;  
initial verification and re-verification;  
metrological inspection (supervision);  
calibration service.

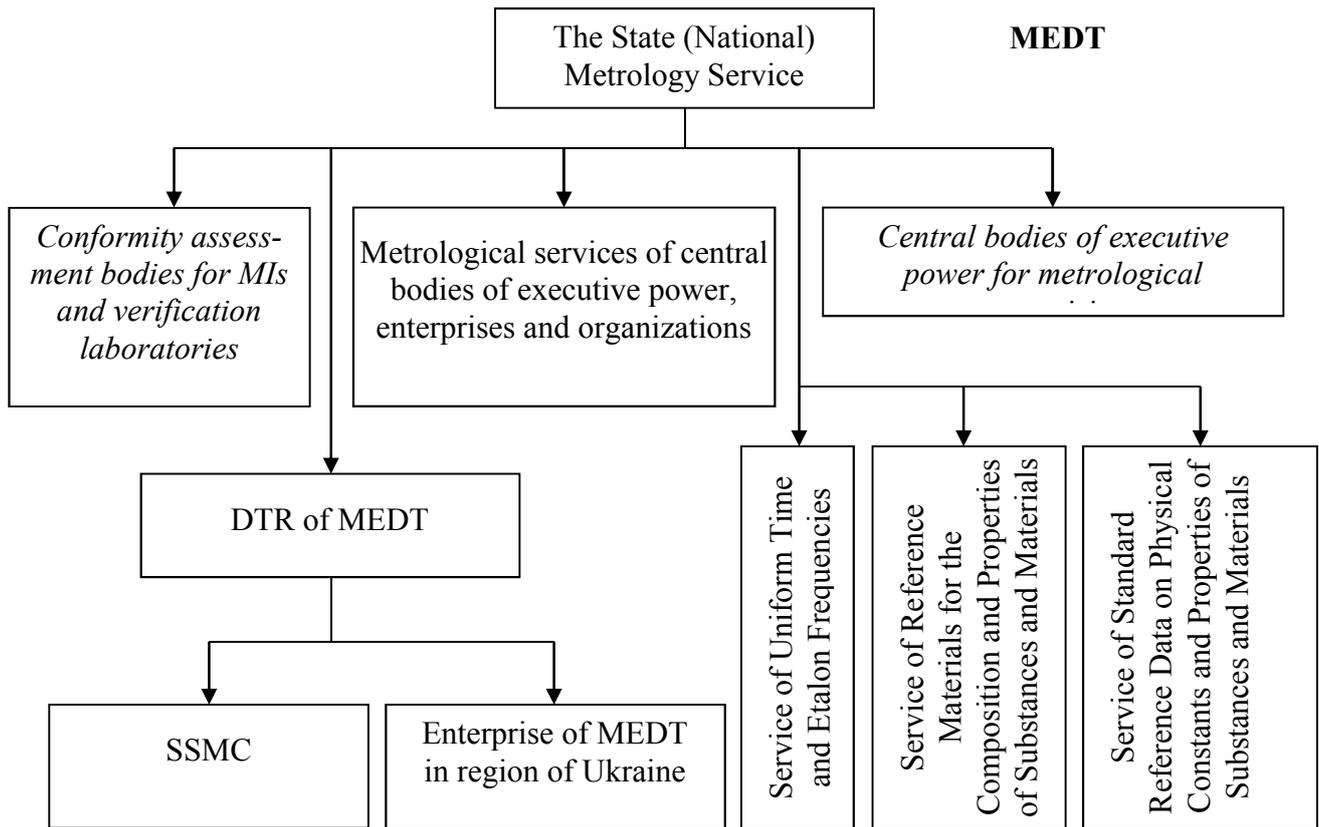


Figure 1 – Structure of the State (National) Metrology Service

Main components of current state (old Laws, 1993, 1998, 2004 from 26.04.1993 to 01.07.2014) and transformation of the national metrological legislative (new Law from 01.01.2016) in Ukraine shown in Table 1.

Table 1 – Main components of national legislation

Component	Current state at 01.07.2014 (current Law)	Transformation from 01.01.2016 (new Law)
Organization structure	State Metrology Service (article 13); DTR of MEDT (article 14); SSMCs (article 15); SUTEF, SRMCP, and SSRD (article 16); regional bodies of MEDT; metrological services of central bodies of executive power, enterprises and organizations (article 17)	National Metrology Service (article 9); DTR of MEDT (article 10); <i>the central body in the SMS</i> ; SSMCs (article 12); SUTEF, SRMCP, and SSRD (article 13); state enterprises of MEDT; metrological services of central bodies of executive power, enterprises and organizations (article 14); <i>conformity assessment bodies for MIs and verification laboratories</i>
	Equipment subject of national control	Current state at 01.07.2014 (current Law)
Type approval	approval by the DTR of MEDT (article 26); realization of state testing by the SSMCs (article 26); realization of state testing by the regional bodies (article 26)	metrological supervision and its types (article 20); <i>state market surveillance of the compliance of legally regulated MIs with the requirements of technical regulations</i> (article 21); <i>metrological supervision of legally regulated MIs in use</i> (article 22); metrological supervision of pre-packaged goods (article 23)
		<i>conformity assessment of MIs</i> (article 16); <i>the procedure for conformity assessment of legally regulated MIs</i> (article 16); <i>the procedure for keeping up the State Registry of Approved Types of MIs</i> (article 16)

Component	Current state at 01.07.2014 (current Law)	Transformation from 01.01.2016 (new Law)
<i>Initial verification and re-verification</i>	realization by the regional bodies (article 28); realization by the SSMCs (with using national measurement standards also) (article 28); authorization in SMS (article 22, 23)	initial verification – <i>module of conformity assessment of MIs</i> (article 16) verification of measuring instruments in use (article 17); authorization for performing verification of MIs in use (article 18, 19)
<i>Metrological inspection</i>	realization SMS by the metrological centers and regional bodies (articles 29, 30); realization SMS by the metrological inspectors (articles 31–35)	the powers of the central body in the area of metrological supervision (articles 24); rights and obligations of state metrological supervision inspectors (articles 25, 26)
<i>Calibration service</i>	realization of calibration by the SSMCs (article 40); realization of calibration by the metrological centers and regional bodies (article 40)	calibration of MIs in general (article 27); realization of calibration of MIs by the SSMCs, calibration laboratories and metrological centers (article 27)

Same important part of transformation of national legislation on metrology in Ukraine is a transition from SMCS to the conformity assessment of MIs and verification of MIs in use. Conformity assessment of legally regulated MIs to the requirements of technical regulations, including initial verification and type approval of MIs, shall be performed if it is provided for by the relevant technical regulations.

The type approval certificate of a MI shall be a document that confirms that the type of a MI has been approved.

Conformity assessment of MIs to the requirements of technical regulations shall be performed by the appointed conformity assessment bodies. The procedure for conformity assessment of

MIs shall be established by the technical regulations and other regulations. Conformity assessment of measuring instruments that are not used in the area of legally regulated metrology shall be conducted on the voluntary basis.

Legally regulated MIs in use shall be liable to periodic verification and verification after repair, and may also be subject to extraordinary, expert and inspection verification. Verification of MIs not used in the area of legally regulated metrology and which are in use shall be performed on voluntary basis.

In Ukraine accreditation of calibration laboratories conducted also on the requirements of the special Law of Ukraine “*On accreditation of conformity assessment bodies*” (no. 2407-III at 17.05.2001) in accordance with the requirements of standard ISO/IEC 17025 (article 10) [16].

### 5. Conclusion and summary

Realization offered approach in a new national the Law on metrology will allow adapting national metrological legislation to the requirements of new documents of international organizations on metrology and to promote effectively of activity of national metrology service in Ukraine.

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### **РАЗВИТИЕ И ТРАНСФОРМАЦИЯ НАЦИОНАЛЬНОГО ЗАКОНОДАТЕЛЬСТВА ПО МЕТРОЛОГИИ В УКРАИНЕ**

*В статье описаны основные компоненты модифицированной Национальной системы метрологии в Украине. Изложено содержание нового законодательства, основы для гармонизации национальных нормативных документов в области метрологии и основные принципы реализации Европейской директивы по средствам измерения в соответствии с модулями оценки соответствия в отношении средств измерительной техники в Украине.*

**Ключевые слова:** законодательная метрология, средство измерения, гармонизация, нормативный документ.

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### **ROZVIТОК І ТРАНСФОРМАЦІЯ НАЦІОНАЛЬНОГО ЗАКОНОДАВСТВА З МЕТРОЛОГІЇ В УКРАЇНІ**

*У статті описані основні компоненти модифікованої Національної системи метрології в Україні. Викладено зміст нового законодавства, основи для гармонізації національних нормативних документів у галузі метрології і основні принципи реалізації Європейської директиви щодо засобів вимірювання відповідно до модулів оцінювання відповідності щодо засобів вимірювальної техніки в Україні.*

**Ключові слова:** законодавча метрологія, засіб вимірювання, гармонізація, нормативний документ.