TOPIC V. THE PURPOSE AND BASIC CONCEPTS OF STANDARDIZATION

OUTLINE:

Goals and objectives of standardization.
Basic concepts and terminology.
Fundamental principles of standardization.
Methods of standardization.

GLOSSARY (ГЛОССАРИЙ)

O`zbекcha	Ruscha	Inglizcha	Mazmuni
Standartlashtirish	Стандартизация	Standardizatio n	mahsulotlar, xizmatlar va jarayonlarga nisbatan umumiy va ko‘p marta foydalaniladigan talablarni belgilash orqali muayyan sohada tartibga solishning maqbul darajasiga erishishga qaratilgan faoliyat..
Standart	Стандартный	Standard	vakolatli organ tomonidan qabul qilingan, muayyan faoliyat yoki uning natijalariga oid qoidalar, talablar va tavsiyalarni belgilovchi me’yoriy hujjat..
Sifat	Качество	Quality	mahsulot yoki xizmatning belgilangan va kutilayotgan ehtiyojlarni qondirishga oid xususiyatlari majmui.
Texnik reglament	Технический регламент	Technical regulation	mahsulot va unga bog‘liq jarayonlarga nisbatan bajarilishi majburiy bo‘lgan talablarni belgilovchi hujjat.
Muvofiqlik	Соответствие	Consistency	mahsulot, jarayon yoki xizmatning belgilangan talablar va mezonlarga mos kelishi.
Me’yoriy hujjat	Нормативный документ	Regulatory document	faoliyat yoki uning natijalariga oid qoidalar, talablar va mezonlarni belgilovchi rasmiy hujjat.

1. GOALS AND OBJECTIVES OF STANDARDIZATION

The main goals of standardization are as follows:

to protect the interests of consumers and the state in ensuring the safety of products, works and services (hereinafter referred to as “products”) for human life, health and property, and for the environment, as well as in conserving resources;

to ensure the interchangeability and compatibility of products;

to improve product quality and competitiveness in line with scientific and technological progress and the needs of the population and the national economy;

to promote the conservation of all types of resources and improve the technical and economic performance of production;

to facilitate the implementation of socio-economic, scientific and technical programmes and projects;

to ensure the safety of national economic facilities, taking into account risks associated with natural and technological disasters and other emergencies;

to provide consumers with complete and reliable information about the range and quality of manufactured products;

to ensure defence capability and mobilization readiness;

to ensure uniformity of measurements.

Main objectives of standardization

to establish optimal requirements for product quality and nomenclature in the interests of consumers and the state;

to create and develop a system of normative documents, and rules for their preparation, adoption and application, establishing the requirements for products intended for the needs of the state, citizens of the Republic and foreign customers, and to ensure compliance monitoring;

to harmonize standard requirements with the requirements of international, regional and national standards of industrially developed countries;

to ensure all types of compatibility (structural, electrical, electromagnetic, information, software-related and others), as well as product interchangeability;

to unify products by defining and applying parametric and size ranges, basic designs, and modular components with standardized structural features;

to coordinate and link the indicators and characteristics of products, their components, parts, raw materials and materials;

to reduce material and energy consumption and promote low-waste technologies;

to establish requirements for the ergonomic properties of products;

to establish metrological standards, rules, regulations and requirements;

to expand the use of international experience in standardization and strengthen the country’s participation in international and regional standardization;

where foreign requirements meet the needs of the national economy of the Republic of Uzbekistan, to expand the direct application of international, regional and national standards of other countries as national standards and technical specifications;

to establish requirements for technological processes;

to organize international cooperation on product standardization and the use of its results;

to create and implement a system for classifying and coding technical and economic information;

to provide normative and technical support for testing, product quality certification, assessment and inspection.

2. BASIC CONCEPTS AND TERMINOLOGY

Standard — a normative document developed on the basis of agreement among interested parties, aimed at achieving an optimal degree of order in a particular field. It establishes generally applicable and repeatedly used rules, principles, recommendations, requirements and methods relating to different types of activities or their results, and is approved by a recognized body. Standards should be based on the generalized results of science, technology and practical experience and should serve society.

Standardization — scientific and technical activity aimed at achieving an optimal degree of order in a particular field by establishing requirements for general and repeated application to existing or potential issues. This activity is reflected in the development, publication and implementation of standards and technical requirements. Its important outcomes include ensuring that products, processes and services are fit for their intended purpose, removing barriers to trade and promoting scientific and technical cooperation.

Standardization object — the item to be standardized, such as a product, process or service.

For the broad interpretation of the term “standardization object”, the expressions “product, process and service” are used. They may apply equally to any material, component, equipment, system, compatibility requirement, rule, operating procedure, function, method or activity. Standardization may be limited to specific aspects or characteristics of an object. For example, footwear may be standardized separately in terms of size and durability.

As an object of standardization, a service includes services provided to the public (including the conditions under which they are provided) and production-related services for enterprises and organizations. Other objects of standardization within their respective fields are determined by the State Committee of the Republic of

Uzbekistan for Nature Protection, the State Committee for Architecture and Construction, and the Ministry of Health.

Harmonized standards (equivalent standards) — standards relating to the same object and approved by different standardization bodies, which ensure the interchangeability of products, processes and services, as well as mutual understanding of information or test results provided in accordance with those standards.

International, regional and national standardization bodies exist.

International standardization is an activity in which the relevant bodies of all countries may participate freely.

Regional standardization — standardization in which the relevant bodies of countries belonging to a single geographical or economic region may participate freely.

National standardization — standardization activity carried out within a particular country.

A standardization document is a normative document containing rules, general provisions or characteristics relating to various types of activities and their results.

The term “normative document” includes standards, technical specifications, general guidelines, instructions and rules.

The goals of standardization are diverse and include unification (management of variety), fitness for purpose, compatibility, interchangeability, health protection, safety, environmental protection, product protection, mutual understanding, and improvement of economic indicators in trade. Several goals may be achieved simultaneously through a single measure.

Fitness for purpose — the ability of a product, process or service to perform its specified functions under defined conditions.

Compatibility — the suitability of products, processes or services for joint use under specified conditions without causing unacceptable effects, so that established requirements can be met.

Interchangeability — the suitability of one product, process or service to be used in place of another to meet the same requirements.

Control of variety (unification) — the selection of optimal dimensions or types of products, processes and services needed to meet a particular requirement.

3. FUNDAMENTAL PRINCIPLES OF STANDARDIZATION

The overall purpose of standardization is to protect the interests of the state and consumers in relation to product quality, processes and services.

Based on this general purpose, the main principles of standardization are as follows:

1. Systematic and comprehensive approach. Comprehensiveness means ensuring the compatibility of all elements within a complex system.
2. Dynamism and progressive development of standardization. Standards should adapt to changes taking place in science and technology. Standards developed by the International Organization for Standardization (ISO) are progressively updated.
3. Effectiveness of standardization. A normative document is effective when its application produces economic or social benefits; in other words, the resources invested in standardization should generate a meaningful return.
4. Priority in the development of standards. Priority should be given to ensuring the compatibility, interchangeability and safety of goods and services.
5. Principle of harmonization. This involves developing harmonized standards that do not create barriers to international trade.
6. Principle of preference. This principle is based on the use of preferred number series, which help reduce the range of products and equipment.

4. METHODS OF STANDARDIZATION

The main methods of standardization include:

1. Unification:
   a) systematization;
   b) classification.
2. Simplification.
3. Typification.
4. Selection.
5. Optimization.
6. Aggregation.

Unification — a form of standardization involving the consolidation of two or more documents (technical specifications), with the intention that the regulated products can be used interchangeably. In other words, unification is the activity of rationally reducing the number of similar parts and assemblies serving the same functional purpose.

The coefficient of product unification (Kn) is expressed by the following formula:

$$Kn = (n - n_0) / n \times 100$$

where n is the total number of parts in a product, including standard, unified, general engineering, inter-industry and industry-specific parts; n_0 is the optimal number of parts.

a) Systematization — the arrangement of products, phenomena and concepts in a clear order and sequence to create a system that is convenient to use. For example, systematization is used in encyclopedias, polytechnic reference books and bibliographies. OKP is the All-Russian Classifier of Industrial and Agricultural Products.

Preferred number series are used to systematize the dimensions and parameters of machines, as well as their parts and components.

b) Classification — the arrangement of products, phenomena and concepts into classes or categories according to their common characteristics. For example, UDC (Universal Decimal Classification) is an international system used to index and categorize humanities and technical literature. Examples include UDC 62 — engineering; UDC 621 — general mechanical engineering and electronics; and UDC 623 — electrical engineering.

Simplification — a form of standardization that reduces the number of types and varieties of products to the level required by current needs. No technical improvements are introduced into the objects of simplification.

Typification — the selection, from a large number and variety of machines, instruments, tools and other items, of those that are rational in terms of quality and share common parts. Its purpose is to eliminate unnecessary variety among products.

Selection of standardization objects (selection) — the selection of specific objects whose continued production is considered appropriate.

Optimization — the determination of optimal key parameters and other values relating to quality and economy.

Aggregation — a method of creating machines, instruments and equipment from separate standardized, unified units. For example, furniture panels in 15 sizes and standard boxes in 3 sizes can be combined in different ways to produce 52 furniture configurations.

KEY TERMS

Standardization; standard; purpose of standardization; main objectives; normative document; technical regulation; product quality; product safety; conformity.

REVIEW QUESTIONS

1. What are the goals and objectives of standardization?
2. What is the state standardization system?
3. What are the stages of the standardization process?
4. What is meant by a category of standard?

MAIN CONCLUSIONS

1. Standardization plays an important role in improving the quality of products and services, ensuring their safety and regulating production processes.

2. The main purpose of standardization is to harmonize requirements for products and services, use resources efficiently and protect consumer interests.
3. Standardization is an important tool for quality management, product safety and improving competitiveness.
4. Studying the basic concepts of standardization helps specialists develop skills in evaluating product quality, using normative documents and complying with standard requirements.

INDEPENDENT STUDY TOPICS

1. Procedures for developing standards.
2. International organizations involved in standardization.
3. Categories and types of standards.

INFORMATION AND METHODOLOGICAL SUPPORT

1. S. Tursunov, Z. Muqimov, A. Nazarov. Fundamentals of Standardization, Metrology and Certification. Textbook, 2021, p. 355.
2. O. Parpiyev, M.P. Nazarov. Fundamentals of Standardization. Study guide. Tashkent, 2022, 109 p.
3. A.M. Nazarov. Metrological Support in Agriculture. Study guide, 2022, 186 p.
4. K.K. Nuriyev. Fundamentals of Standardization, Interchangeability, Metrology and Certification. Textbook. Guliston: Ziyo Publishing and Printing, 2023, 533 p.
5. S.S. Tuxtamishev. Fundamentals of Metrology, Standardization and Certification. Study guide. Tashkent: NIF MISH, 2024, 176 p.

SELF-ASSESSMENT TESTS

1. What is the main purpose of standardization?

A. To establish uniform requirements for products and services and ensure quality and safety.
B. To stop production.
C. To increase product prices.
D. To increase the number of product types without limit.

2. What is a standard?

A. A document establishing requirements and rules for a particular activity or its results.
B. A financial report only.
C. A document that determines the price of a product.
D. An advertising document only.

3. What does product quality express?

A. The characteristics of a product that enable it to meet stated and expected needs.

B. Only the weight of the product.
C. Only the date of manufacture.
D. Only the external appearance of the product.

4. What is the main task of unification?

A. To rationally reduce the variety of products and parts.
B. To reduce product quality.
C. To unjustifiably increase production costs.
D. To manufacture products without control.

5. What is one benefit of standardization?

A. Uncontrolled production of products.
B. A reduction in product quality.
C. A decrease in product safety.
D. Increased disorder in production.