

STANDARDISATION AND VARIETY REDUCTION

History of Standardization

- **Prehistoric standardization**
 - The stone implements of similar **form and shape**.
 - **Indus valley civilization** used standardization for **town planning, water supply, drainage, house building** and even **weights and measures**.
- Between the **7th century B.C.** and the **17th century A.D.**,
 - **Standards** for **units of measurement of length, volume, weight and money** were further developed in various parts of the world.
- The development of **standardization** as an **engineering activity**
 - **Eli Whitney** introduced the **production of interchangeable components** for the manufacture of guns.
 - **Standardization of screw threads** by Sir Joseph Whitworth (1841)
 - Railways: Establishment of **standard width between the two rails** on the railway track, the manufacture of **railway couplings, air brakes** and the **signalling system** called for increasing levels of systematized work.

History of Standardization

- **Mass production** became possible through standardization.
- **19th century:** standardization was recognized in industrialized countries as a powerful tool to increase productivity through interchangeability and reduction of variety.
- **20th century:** the establishment of several standardization bodies in the **United States of America**
 - National Bureau of Standards (**NBS**),
 - Society of Automotive Engineers (**SAE**),
 - American Society for Testing and Materials (**ASTM**),
 - American Society of Mechanical Engineers (**ASME**),
 - By 1928, national standards bodies(**NSBs**) had been established in 16 industrialized countries.
- After **the First World War**, **standardization**, through reduction in variety, was established as a useful management tool for reducing costs.
- After **the Second World War**, to safeguard interest of customers and to meet the rising demand for standards for finished products, **standardization activities increased** in various countries, with the additional support and involvement of government and industry.

History of Standardization

- With **increased trade among industrialized countries**, internationally accepted norms or standards were needed to support this development.
- The establishment of international bodies for standardization: International Electrotechnical Commission (IEC) in 1906 and the **International Organization for Standardization (ISO)** in **1947**.
- Following the colonial era in Asia and Africa and accessorially in Latin America, factors such as **excess demand over supply, low purchasing power** and **problems with adherence to foreign standards** led to the establishment of NSBs.
- In developing countries and in those countries that had recently gained their independence, the aim of these standards bodies was to **formulate national standards to suit local technologies, materials and consumption patterns**.
- Organized standardization has now become an important element of infrastructure needed for the healthy growth of industry and commerce in all countries of the world.

Standards and standardization

- **Standard:** A standard is a document which provides **requirements, rules, and guidelines**, for a **process, product or service**. These requirements are sometimes complemented by a **description of the process, products or services**.
- Standards are the **result of a consensus** and are **approved by a recognized body**.
- Standards **aim at achieving the optimum degree of order** in a given context.
- **Standardization:** The process of **formulating, issuing and implementing standards** is called **standardization**.

The primary aims of standardization

1) Fitness for purpose:

- ✓ **Fitness for purpose** is the ability of the process, product or service to fulfil a **defined purpose** under **specific conditions**. Any product, process or service is intended to meet the needs of the user. Sometimes the expectations of the users may be **at variance** with the actual purpose.
- ✓ It is **difficult for the users** to always spell out the desirable quality of the process, product or service. Standards help by **identifying the optimum parameters** for the performance of a process, product or service (e.g. **product standards**) and the method for **evaluating product conformity** (such as **test method standards** and **quality control standards**).
- ✓ Standards also lay down **conditions for using the process, product or service**, as otherwise any failure of the process, product or service due to improper use may be attributed by the users to a deficiency or lack of quality of the process, product or service.

2) Interchangeability

- ✓ The suitability for a process, product or service to be **used in place of another to fulfil a relevant requirement** is called **interchangeability**.
- ✓ Through a **deliberate standardization** process, it is possible to make processes, products or services **interchangeable**, even if they are created in different countries.
- ✓ For example,
 - **shaving blades** of different brands may be designed to be used in the same razor;
 - **injection needles** of different sizes and brands may be designed to fit the same hypodermic syringe.

The primary aims of standardization

3) Variety reduction

- ✓ While a large number of varieties for a particular process, product or service may be helpful to consumers and enable them to select the most appropriate, this large number of varieties **requires large inventories**, resulting in **high costs to manufacturers**.
- ✓ **Variety reduction** is one of the aims of standardization for the selection of the optimum number of sizes, ratings, grades, compositions and practices to meet prevailing needs.
- ✓ Balancing between too many and too few varieties is in the best interest of both manufacturers and consumers.
- **Compatibility**
- ✓ Parallel developments of processes, products or services, which are required to be used in combination, pose problems if they are not compatible.
- ✓ One of the aims of standardization is **compatibility**, that is **suitability of processes, products or services** to be used together under **specific conditions** to fulfil the relevant requirements, without causing unnecessary interaction.
- ✓ For example in electronic data processing, information has to be coded for **storage, transmission and retrieval** in the form of **electronic pulses**. To make the code recognizable for any machine and all times, it has to be standardized.
- ✓ Such **standardization helps to establish compatibility** between various machines or subsystems and **permits expansion features** and information exchange amongst different systems.

The primary aims of standardization

4) Guarding against factors that affect the health and safety of consumers

- ✓ Safety of the **process, product or service** is of **great importance** if, under certain conditions, the use of the **process, product or service** may pose a **threat to human life or property**.
- ✓ Therefore, identification of processes, products or services and their safety parameters, **not only under normal use but under possible misuse**, is one of the important requirements of standardization.
- ✓ **Examples:**
 - Items for human consumption should be **free from poisonous substances**:
 - If **food colours** are used in candy or sweets, they should be **free from poisonous substances** like lead or arsenic.
 - If an **electrical appliance** is manufactured, it should be **well insulated** to be **free from electrical hazards**: electric irons, for example, **should be designed** so as to **guard their user against electrical shock** from any part of the iron.
 - **Safety standards** also broadly cover the **requirements to ensure the safety of equipment** (e.g. a **dustproof enclosure** for equipment) and that of **people and the environment** (e.g. **flameproof enclosures** for equipment used in mines).

The primary aims of standardization

5) Environmental protection

- ✓ Environmental protection is an important aim of standardization: the focus here is on **preserving nature from damage** that may be caused during the manufacture of a product or during its use or disposal after use.
- ✓ For example, the domestic use of a **washing machine** should generate only a **minimum of pollutants**.

6) Better utilization of resources

- ✓ Achievement of **maximum overall economy** through **better utilization of resources** such as **capital, human effort and materials** is an important aim of standardization.
- ✓ In manufacturing organizations, it is this aspect of **standardization of materials, components and production methods** that makes it **possible to reduce waste** and to carry out **mass production** in an economic way.
- ✓ For example, in **construction and civil engineering**, the use of the **appropriate quantities of cement and steel** to achieve a **required strength** are recommended in **building standards and codes of practices**.

The primary aims of standardization

7) Better communication and understanding:

- Whenever the **transfer of goods and services** is involved, standards spell out what **means of communication** are to be used **between different parties**.
- Since standards **contain information** that is recorded in a **precise and documented form**, they contribute towards **better communication and understanding** in a large variety of settings.
- In **public places** such as airports, railway stations and highways for instance, **standardized signs** play an important role.

8) Transfer of technology:

- Standards act as a good vehicle for **technology transfer**. Since standards incorporate the **results of advances in science, technology and experience**, they **reflect the state of the art** in technical development.
- As **standardization is a dynamic process**, standards are **updated as new technologies** are developed.

The primary aims of standardization

9) Removal of trade barriers:

- **Restrictions on the export of processes, products or services** by the introduction of some **technical barriers to trade**, such as **arbitrary product requirements**, are being viewed with great concern.
- **Standards prevent such non-tariff barriers to trade** by harmonizing requirements in a manner that promotes **fair competition**.
- Purchasers can be **convinced about the quality level of a product** that has been manufactured according to a **recognized standard**.

Benefits of standardization

- As standardization is aimed at achieving **maximum overall economy**; Standards provide benefits to **different sectors of society**.
 - Some of the **benefits of standardization** are as follows:
- 1) For manufacturers, standards:
 - **Rationalize** the manufacturing process.
 - **Eliminate or reduce wasteful material or labour**.
 - **Reduce inventories of both raw material and finished products**.
 - **Reduce the cost of manufacture**.
 - 2) For customers, standards:
 - **Assure the quality of goods purchased and services received**.
 - **Provide better value for money**.
 - Are **convenient for settling disputes**, if any, with suppliers.

Benefits of standardization

3) For traders, standards:

- Provide a workable basis for acceptance or rejection of goods or consequential disputes, if any.
- Minimize delays, correspondence, etc., resulting from inaccurate or incomplete specification of materials or products.

4) For technologists, standards:

- Provide starting points for research and development for further improvement of goods and services.

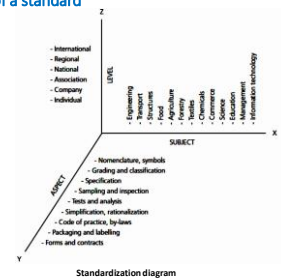
Attributes of a standard

• A standard generally has three attributes:

- ✓ **Level:** such as at the company, national or international level.
- ✓ **Subject:** such as engineering, food, textile or management.
- ✓ **Aspect:** such as specification, testing and analysis, packaging and labelling.

(more than one aspect may be covered in a single standard: a standard may include specification of items such as the product, its sampling and inspection, related tests and analysis, packaging and labelling).

- For example the term "Indian Standard Specification of Biscuits", means that the standard is a national standard (level), in the food area (subject), and provides specifications (aspect) for the biscuits.



(created by Dr. Lal C. Verman founder and Director General of the Bureau of Indian Standards, the national standards body of India.)

Types of Standards

- Standardization can be undertaken at four significant levels.

- 1) International,
- 2) National,
- 3) Association (or industry),
- 4) Company.

Company Standards

- Company standardization includes all those activities that are aimed at streamlining, coordinating, and documenting generally accepted information (or procedures).
- Company standardization may deal with engineering standards, production standards, administrative and financial norms, codes of practice for manufacturing and maintenance, and even codes for conducting activities such as market surveys and cost estimates.
- Standardization provides a company with the means for the simplification and rationalization of its operations.
- Company standardization should be understood in its wider sense to cover all sorts of enterprises, including, inter alia, government departments, project authorities, institutions and municipalities.
- In other words, company standardization may be called "enterprise standardization" that covers large, medium, small, private, official or semiofficial organizations.

Procedures for company standardization

- The procedures followed for preparing company standards differ widely from firm to firm.
- The feature that is essential to ensure **the effectiveness of standards** is common to all: **all standards stem from a consensus between all parties who refer to and use standards** in their daily work.
- In formulating company standards, any one of three methods can be used:
 - (a) **the committee method**,
 - (b) **the consultative method**, or
 - (c) **a combination of both**
- **Once** they have been prepared, **company standards are mandatory** for implementation within the company.

Benefits of company standardization

- 1) Company standards **provide the best possible solutions** that can be applied to **recurring problems**. In this way, a **waste of time and energy is avoided**, as well as **resorting to ad hoc solutions** for the same problems;
 - 2) Company standardization can also **control the growing varieties of tools, materials, components and products** that are **used by the company**, and thus **achieve maximum overall economy**.
 - 3) Today in any company, there is a **fair amount of labour turnover**. The **experience gained** by the company over a **period of time should not be lost** because of this. Company standards **prevent this drain of valuable experience** by **documenting it in the form of company standards**. In this way, **experience always remains within the company**.
- **As a policy**, **company standards should adopt national standards** whenever these are available. Companies **should resort to formulating their own standards only when national or international standards are not available**.

Industry Level Standardization

- **Industry level standardization** serves to **integrate company standards** and unify them in the interest of the industry as a whole.
- Industry level standards also **serve as a basis for overall integration at the national level**.
- In advanced countries such as the United States, **standardization at the industrial level** is highly developed. There are about 500 **associations, professional bodies and governmental agencies** that have issued and continue to issue thousands of **industry level standards** in a large number of fields.
- For example, organizations such as **the ASTM, the American Petroleum Institute (API)** and the **ASME** issue **industry level standards**.

Industry Level Standardization

- **Industrial associations and professional bodies** play a very significant role in the **standardization movement** in the United States.
- However, while industrial associations are important in this process in the United States, **standardization activity at the national level is limited** in this country.
- In **other advanced countries**, the **balance between industry level and national level standards** is well maintained.
- In **developing countries**, **standardization activity is mainly centred on the NSBs**. These **NSBs encourage** the advancement of **industry level and company level standardization**.

National Level Standards

- Amongst the various levels of standardization, i.e. the level of the individual, the company, the industry or the country, it is the national level that is most important.
- It is at the national level that the standardization requirements of individuals, companies and the industry are coordinated and integrated into purposeful national standards.
- At the same time, national level standards serve as a basis for forging international agreements on international standards, which help to promote worldwide exchanges of goods and services.

National standards bodies (NSBs)

- The work of preparing and issuing National standards is carried out by NSBs.
- In some countries,
 - NSBs are called "institutions" or "institutes" (e.g. Sri Lanka Standards Institution, British Standards Institute).
 - NSBs are called "associations" (e.g. Standards Association of Zimbabwe) or "bureaus" (Bureau of Indian Standards).
 - a department or an agency of the government is responsible for the work of developing national standards.
- Most of the NSBs around the world are members of the ISO; in some countries that do not have NSBs, provisions exist for a correspondent membership status with the ISO.
- At present, 165 countries are members of the ISO.
- Fifteen NSBs were established between 1917 and 1925, mostly in developed countries. Germany was the first country to establish the same.
- In developing countries, NSBs were launched after 1940. First in Brazil (1940). In India it was established in 1947. Currently, 60 per cent of the members of ISO are developing countries.

Functions of NSBs

- 1) Preparation and promulgation of national standards;
- 2) Promotion of the implementation of standards by industry;
- 3) Certification of products;
- 4) Provision of information on standards and related technical matters, with regard to both national and international standards;
- 5) Country representation in international activities and at forums that deal with standards.

Structure of NSBs

- Broadly speaking, an NSB usually consists of two main structures: (i) the directorate and (ii) the committee department.
 - a) **The directorate department:** The responsibilities of the directorate, or secretariat, include
 - 1) the administration of the affairs of the NSB and serving the various committees.
 - 2) Major tasks include publishing and organizing the sale of standards and other publications.
 - b) **The committee and council department:** of an NSB comprises a policymaking body called the general council or general body and several division councils or industry committees that are each responsible for fairly large industrial sectors.

Division councils

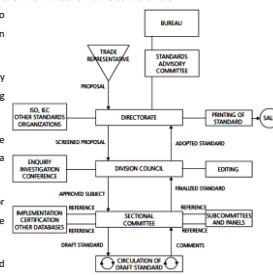
- The division councils are made up of **representatives of industry, trade and other organizations** that have an interest in the standardization process.
- The division councils or industry committees **determine the technical policies and programmes of standardization** for their own sector of industry.
- The division councils or industry committees **appoint sectional or technical committees** to undertake the **actual preparation of standards** in specific fields. The **knowledge and experience of interest groups** such as manufacturers, users, government departments and universities is **pooled in these committees**.
- In turn, these **committees may create working groups or subcommittees** for in-depth studies and **investigations on specific aspects of problems** encountered in the development of standards and for **preparing draft standards**.

Development of National Standards: Principles

- National standards** shall fulfil the **generally recognized needs** of industry, trade, technology and other sectors of national life;
- They shall **safeguard the interests** of both the **producer and the consumer**;
- They shall **represent the largest possible national consensus** of opinion between all the interests concerned;
- They shall be **aimed at maximum overall economy** through **better utilization of national resources**;
- They shall be **subject to periodic revision and amendment** and be kept **up to date** to reflect the **latest advances in technology** and the progressively **changing conditions of the national economy**.

Steps followed in the preparation of national standards

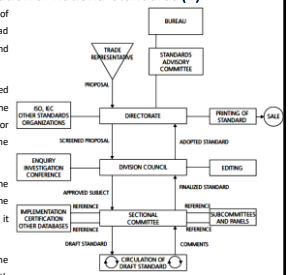
- Submission of proposal:** Trade representative submits a proposal to the NSB for preparing a new standard or revising or amending an existing standard;
- Preliminary Examination:** The directorate of the NSB preliminarily examines the proposal for its consistency with the underlying principles for the preparation of standards;
- Approval by division council:** The division council decides to approve or reject the new project for the preparation or amendment of a national standard;
- Preparation of draft standard:** existing technical committee or sectional committee prepares the draft standard or alternatively, the committee may appoint a subcommittee and/or panels.
- Review by technical committee:** After the draft has been prepared by the subcommittee, the technical committee reviews it extensively and then passes it on to the Secretariat for editing and wide circulation;



The flow for the development of standards by NSBs.

Steps followed in the preparation of national standards (2)

- Circulation of the draft:** The draft is widely circulated. The aim of wide circulation is to inform every interest in the country or abroad that may be affected by the draft and to invite critical review and comments.
- Amendment the final version of the draft:** Any comments received are incorporated into the draft, which is amended accordingly. The comments on the draft are systematically examined by the technical or sectional committee. The final version of the draft is drawn up by the Secretariat;
- Submission of the final version & approval:** The final version of the draft is submitted to the division council for approval and finally to the General Council or its chairman. Once approved by these offices, it becomes a national standard;
- Publication of the standard:** The approved standard is issued by the Secretariat in a publication that is produced for sale to the public, with wide publicity about the new standard given in the press and in the journal of the NSB.



The flow for the development of standards by NSBs.

Facts about National standards

- National standards can be **mandatory** or **voluntary**.
- **Mandatory standards** are found in **countries** with a **centrally controlled economy**, while countries with a **free enterprise economy** normally have **voluntary standards**.
- In most countries there is a **mixed or selective approach** in the **enforcement of national standards**. This means that **all standards** are **voluntary except** those that deal with **safety and health**.
- **Developing countries** can benefit considerably in adopting **international standards as national standards**, since the **process of developing standards** is **time-consuming and costly**.

International Standardization

- The ultimate goal of standardization is **to achieve international accord** on **all technical matters** relating to **the exchange of goods and services between one nation and another**.
- The creation of **the first international body** to undertake **standardization work** at **international level** in the **electrotechnical field** dates back to **1906**, when **15 countries** officially established the **International Electrotechnical Commission (IEC)**.
- **Pioneering work** of standardization in other fields was **started in 1926** by the **International Federation of the National Standardizing Association (ISA)**. The activities of **ISA** came to an end in **1942**. In **1946**, **delegates** from **25 countries** met in **London** and decided to create a **new international organization** whose purpose would be to **“facilitate the international coordination and unification of industrial standards”**.
- The new organization was called the **International Organization for Standardization (ISO)**, and officially **began** its operations on **23 February 1947**.

International Organization for Standardization (ISO)

- The abbreviation **ISO** was derived from the **Greek word *isos***, meaning **“equal”**. Therefore, **whatever the State**, whatever the **language**, the **short form for the name of the organization is always ISO**. At present **ISO** is a **network of NSBs of 165 States**, on the basis of **one member per country**, with a **central secretariat in Geneva, Switzerland**, that coordinates the system.
- **ISO** is a **non-governmental organization**. Its **members are not**, as in the case of the **United Nations system**, **delegations of national governments**.
- Nonetheless, **ISO occupies a special position midway between the public and private sectors**.
- This is **because**, on the one hand, many of its **member institutes are part of the governmental structure of their countries**, or are **mandated by their government**, and on the other hand, **some ISO members are uniquely from the private sector**, as they have been set up by **national partnerships between industry associations**.
- **ISO acts as a bridging organization** in which a **consensus** can be reached on **solutions** that meet both the **requirements of business and the broader needs of society**.

Benefits of international standards – (1)

- The **international standards of ISO** contribute to **benefiting consumers, businesses, governments and society** at large in the following ways:
 - **For consumers:** conformity of products and services with international standards provides assurance to consumers on the **quality, safety and reliability** of these products and services.
 - **For businesses:** by adopting international standards, suppliers can conduct the development of their products and services on the basis of specifications that have **wide acceptance** in their sector. This in turn means **that businesses that use international standards are increasingly free to compete in many more markets** around the world.
- The **application of international standards** facilitates **contracting and ordering of goods and services** and the **assessment of their quality**—it also reduces **disputes over specifications and quality**.

Benefits of international standards – (2)

- **For governments:** international standards provide the technological and scientific bases that underpin health, safety and environmental legislations.
- **For everyone:** international standards can contribute to quality of life in general by ensuring that the transport modes, machinery and tools we use are safe.
- **For the planet:** international standards on air, water, and soil quality, and on emission of gases and radiation, can contribute to efforts to preserve the environment.

Standards by ISO

- Standards by the ISO are **voluntary**. The ISO itself does not **regulate** or **legislate**.
- Some ISO standards, especially those that deal with **health, safety** or the **environment**, may be **adopted** by the regulatory authorities in the countries as a **part of their legislation**.
- However, although ISO standards are voluntary, they may become a **market requirement**, as has happened with the **ISO 9000 Quality Management System**;
- Other **examples of standards** that are applied very consistently in the **transport** and **finance industries** are the **international standards** for the **dimensions of freight containers** and the **international standards** for **bank cards**.

International Standardizing Bodies

Name	Fields of standardization
Codex Alimentarius Commission (CAC)	Specification, sampling and analysis of food products; food additives; food hygiene; pesticide residues; contaminants; labelling; essential composition; nutritional aspects; veterinary drug residues; inspection and certification systems for foods that are to be imported or exported
Cooperation Centre for Scientific Research Relative to Tobacco (CORESTA)	Analysis and testing of tobacco and tobacco products
Euro-International Committee for Concrete (CEB)	International recommendations and codes of practice for use in building and civil engineering work
FDI World Dental Federation (FDI)	Dental instruments and equipment; working environment of the dentist
Intergovernmental Organization for International Carriage by Rail (OTIF)	International carriage of dangerous goods.

International Standardizing Bodies – (2)

International Air Transport Association (IATA)	Standards for airport and passenger services, cargo services, cargo and passenger agents
International Association for Cereal Science and Technology (ICC)	Testing and analysis of cereals and cereal products
International Atomic Energy Agency (IAEA)	Nuclear and radiation safety standards
International Bureau for the Standardization of Man-made Fibres (BISFA)	Specification and testing on man-made fibres
International Bureau of Weights and Measures (BIPM)	Units, standards and methods of measurement of physical quantities
International Civil Aviation Organization (ICAO)	Air transport; air navigation; aviation safety; airports design; airworthiness; aircraft noise; international law, etc.
International Commission for Uniform Methods of Sugar Analysis (ICUMSA)	Methods of sugar analysis

International Standardizing Bodies – (3)

International Commission on Illumination (CIE)	Metrology in the fields of light, lighting and colour; science, technology and art of light, lighting and colour
International Commission on Irrigation and Drainage (ICID)	Irrigation and drainage; terminology
International Commission on Radiation Measurements (ICRU)	Radiation units and measurements; radiation units and dosimetry
International Commission on Radiological Protection (ICRP)	Radiation hazards and radiation protection
International Council for Building, Research Studies and Documentation (CIB)	The activities of CIB focus mainly on pre-standardization work.
International Council for Standardization in Haematology (ICSH)	Recommendations or recommended methods on haematology for use in medical practice

International Standardizing Bodies – (4)

International Council on Combustion (CIMAC)	Acceptance tests for combustion engines; engine noise; pollution
International Dairy Federation (IDF)	Milk and milk products (composition, sampling and analyses); milk farm and factory equipment; disinfectants
International Federation for Information and Documentation (FID)	Classification
International Federation of Fruit Juice Producers (IFJU)	Fruit juice analysis
International Federation of Library Institutions (IFLA)	Bibliographic control and other aspects of associations and library matters
International Gas Union (IGU)	Safety of gas transmission, distribution and utilization; use of SI units in the gas industry
International Institute of Refrigeration (IIR)	Tests of thermal performance of insulated vehicles; tests of insulated materials; refrigerated storage and transport of perishable foodstuffs; food freezing; refrigerating equipment; terminology

International Standardizing Bodies – (5)

International Institute of Welding (IIW)	Welding and allied processes
International Labour Organization (ILO)	Working conditions and environment; occupational safety and health; equality of treatment between men and women; non-discrimination; rights of tribal and indigenous peoples; employment
International Maritime Organization (IMO)	Maritime safety; prevention of pollution from ships; facilitation of international maritime traffic
International Office of Epizootics (OIE)	Advice on standardization of procedures in the preparation of vaccines, serums, diagnostic reagents etc., to control epizootics
International Olive Oil Council (IOOC)	Table olives; olive oil; olive pomace oils
International Organization of Legal Metrology (OIML)	Measuring methods and units; measuring devices and instruments; verification and control of measuring devices (from a legal point of view)

International Standardizing Bodies – (6)

International Seed Testing Association (ISTA)	Seed testing
International Silk Association (ISA)	Silk testing and classification
International Telecommunication Union-Radio Communication Bureau (ITU-R)	Radio communications
International Telecommunication Union-Telecommunication Standardization Sector (ITU-T)	All aspects of telecommunication equipment, systems, network and voice and non-voice services, including: telegraphy; telephony; data communication; telematics; message handling; audiovisual; multimedia; integrated services; digital networks; universal personal telecommunication; intelligent networks. All technical, operating and administrative areas, including: service definition; network operation, numbering and routing; traffic engineering; maintenance and telecommunication management network; tariff and accounting principles; data networks; open systems interconnection; switching and signalling; quality of service and performance management; transmission media systems and equipment
International Union of Leather Technologists and Chemists Societies (IULTCS)	Analysis and testing of leather

International Standardizing Bodies – (7)

International Union of Pure and Applied Chemistry (IUPAC)	Nomenclature, terminology, symbols, quantities and units in chemistry
International Union of Railways (UIC)	Projects and studies necessary for the improvement of international rail traffic
International Union of Laboratories and Experts in Materials, Systems and Structures (RILEM)	Nomenclature and testing of building materials and structures
International Organisation of Vine and Wine (OIV)	Methods of wine analysis; oenology; labelling
International Wool Textile Organization (IWTO)	Testing of wool textiles
United Nations Educational, Scientific and Organization (UNESCO)	Scientific and technological information and cultural documentation, libraries and archives

International Standardizing Bodies – (8)

World Health Organization (WHO)	All matters directly or indirectly related to health, including biological and pharmaceutical substances, food additives, pesticides, pesticide residues in food, food safety, air and water quality, diagnostic procedures, terminology, nomenclature and classification
World Intellectual Property (WIPO)	Patents; trademarks; industrial designs; appellations of origin; copyright; neighbouring rights; classification systems
World Meteorological Organization (WMO)	Meteorological and hydrological observations; agricultural, aeronautical and marine meteorology; data processing and telecommunications

Regional Standardization

- Countries in the same region have **similarities** in **climate, culture, governmental policies, consumption, industrial production** and other areas.
- Therefore, there might be a need for **common standards**.
- In order to deal with **these regional issues** in the field of **standardization**, **regional standards organizations** are working in **various regions** of the world. The important ones are:
 - 1) European Committee for Standardization
 - 2) Pan American Standards Commission
 - 3) Arab Organization for Standardization and Metrology
 - 4) African Regional Organization for Standardization