

## CHAPTER II

### STANDARDS AND ORGANIZATIONS

*Measurement standards* are those devices, artifacts, procedures, instruments, systems, protocols, or processes that are used to define (or to realize) measurement units and on which all lower echelon (less accurate) measurements depend.

A measurement standard may also be said to store, embody, or otherwise provide a physical quantity that serves as the basis for the measurement of the quantity. Another definition of a standard is the physical embodiment of a measurement unit, by which its assigned value is defined, and to which it can be compared for **calibration** purposes.

**Calibration** is the setting or correcting of a measuring device or base level, usually by adjusting it to match or conform to a dependably known and unvarying measure. (Compares a measurement within a standard where all measurement should same in everywhere).

In general, it is not independent of physical environmental conditions, and it is a true embodiment of the unit only under specified conditions. Another definition of a standard is a unit of known quantity or dimension to which other measurement units can be compared.

A body or a group which produce a standard is called an organization. An organization have different for different country. Examples for an organization International Organization for Standardization (ISO), the International Electro technical Commission (IEC), the American National Standards Institute (ANSI), and the Standards Council of Canada (SCC), Ethiopian Conformity Assessment Agency.

#### 2.1 What is standards? Need for organization?

The International Organization for Standardization defines a *standard* as follows: *A document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.*

Standard can be classified as:

1. International standards
2. Primary standards
3. Secondary standards
4. Working standards

**International standards** are defined by international agreement. They are checked periodically by absolute measurements, in terms of the fundamental unit concerned. They represent certain units of measurement to the closest possible accuracy attainable by the science and technology of measurement. International standards are not available on a daily

basis for calibration or comparison. An example of an international standard is the kilogram mass

***Primary standards*** are maintained in the national standardizing laboratories of different countries. These standards are not available for use outside the national laboratory, although they may be used to calibrate secondary standards sent to that laboratory. Primary standards are themselves calibrated at the various national laboratories by making absolute measurements in terms of the fundamental units.

Primary standards are maintained in national standards laboratories in countries around the world. Primary standards, representing some of the fundamental physical and electrical units, as well as some derived quantities, are independently measured and calibrated at the various national laboratories and compared against each other. This process leads to grand or world average figures for the standards. Primary standards are used continually, but generally do not leave the national standards labs.

***Secondary standards*** are maintained in various laboratories in industry. Their prime function is to check and calibrate working standards. Responsibility for maintenance of the secondary standard is with the industrial laboratory concerned, although periodically these may be sent to national standardizing laboratories for checking and calibration. Secondary standards are reference standards which are initially calibrated from primary standards and then used in industry and research labs on a daily basis to calibrate their working standards, which are in turn used on a daily basis to check and calibrate working laboratory instruments.

***Working standards*** are the principal tools of a measurement laboratory. These standards are used to check and calibrate the instruments used in the laboratory or to make comparison measurements in industrial application. Working standards are periodically checked against secondary standards.

#### **The Need for Standards for organization**

Standards define the units and scales in use, and allow comparison of measurements made in different times and places. Standards can serve different purposes. They can do all of the following:

- ❖ Provide reference criteria that a product, process, or service must meet
- ❖ Provide information that enhances safety, reliability, and performance of products, processes, and services
- ❖ Assure consumers about reliability or other characteristics of goods or services provided in the marketplace
- ❖ Give consumers more choice by allowing one firm's products to be substituted for, or combined with, those of another

### **Realize a direct return on investment by**

- ❖ Lowering installation and startup costs
- ❖ reducing need to maintain large inventories
- ❖ enabling interchangeability of components
- ❖ improving design with less "custom" effort
- ❖ increasing safety

### **Use of standards in industry**

- ❖ improves communication
- ❖ provides practical application of expert knowledge
- ❖ represents years of experience and avoids necessity of starting each project from ground up

### **Standards help you achieve operational excellence by**

- ❖ improving performance
- ❖ lowering maintenance costs
- ❖ reducing downtime
- ❖ enhancing operability saving money

## **2.2 Existing standard organization**

Standards organizations can be classified by their *role, position, and the extent of their influence on the local, national, regional, and global standardization* arena.

By geographic designation, there are

- ❖ international
- ❖ regional and
- ❖ national standards bodies

By technology or industry designation, there are

- ❖ standards developing organizations (SDOs)
- ❖ Standards setting organizations (SSOs) also known as consortia.

Standards organizations may be

- ❖ governmental,
- ❖ quasi-governmental or
- ❖ Non-governmental entities.

Quasi- and non-governmental standards organizations are often non-profit organizations.

### **1. International standards organizations**

Broadly, an international standards organization develops international standards. (This does not necessarily restrict the use of other published standards internationally.) There are many international standards organizations. The three largest and most well-established such organizations are *the International Organization for Standardization, the International Electro technical Commission, and the International Telecommunication Union*. They have established tens of thousands of standards covering almost every conceivable topic.

### **2. Regional standards organizations**

Regional standards bodies also exist, such as the *European Committee for Standardization (CEN), the European Committee for Electro technical Standardization (CENELEC), the European Telecommunications Standards Institute (ETSI), and the Institute for Reference Materials and Measurements (IRMM) in Europe, the Pacific Area Standards Congress (PASC), the Pan American Standards Commission (COPANT), the African Organization for Standardization (ARSO), the Arabic industrial development and mining organization (AIDMO), and others.*

### **3. National standards bodies**

In general, each country or economy has a single recognized national standards body (NSB). A national standards body is likely the sole member from that economy in ISO; ISO currently has 163 members. National standards bodies usually do not prepare the technical content of standards, which instead is developed by national technical societies.

Example *British Standards Institution (BSI) U.K, Bureau of Indian Standards (BIS) India, Standards Council of Canada, Ethiopian conformity assessment enterprise (ECAE)*

*ECAE has 6 specialized testing laboratories operating at the head quarter, and 5 of them are accredited (Chemical, Electrical, Mechanical, Microbiology & textile) Radiation laboratory is in process to be accredited. Electrical laboratory is one of those accredited laboratories*

#### **Products tested by ECAE'S Electrical laboratory**

*Solar battery charge controller, solar panel, solar inventor, electric cable, electric wires, circuit breakers, plug and socket outlets, switch, junction box, incandescent lamp, fluorescent lamp, compact fluorescent( energy saving lamp), primary battery, LED lamp, etc...*

#### **Standards developing organizations (SDOs)**

Whereas, the term *national standards body* (NSB) generally refers to the one-per-country standardization organization that is that country's member of the ISO, the term *standards developing organization* (SDO) generally refers to the thousands of industry- or sector-based

standards organizations that develop and publish industry specific standards. In some cases, international industry-based SDOs such as the IEEE and the Audio Engineering Society (AES) may have direct liaisons with international standards organizations, having input to international standards without going through a national standards body.

SDOs are differentiated from standards setting organizations (SSOs) in that SDOs may be accredited to develop standards using open and transparent processes.

### **2.3 Quality assurance**

Quality assurance (QA) as a means to ensure a high level of quality in production during the development of products or services. Quality assurance is one facet of the larger discipline of quality management. Managing the quality of production involves many detailed steps of planning, fulfilling and monitoring activities. The quality assurance function is concerned with confirming that a firm's quality requirements will be met.

Quality assurance (QA) is any systematic process of determining whether a product or service meets specified requirements. QA establishes and maintains set requirements for developing or manufacturing reliable products.

A quality assurance system is meant to increase customer confidence and a company's credibility, while also improving work processes and efficiency, and it enables a company to better compete with others.

**Quality assurance:** all the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfill requirement for quality.

- ❖ Focused on process
- ❖ Pro-active
- ❖ Staff function

**Quality control** is the operational techniques and activities used to fulfill the requirement of quality.

- ❖ Focused on product
- ❖ Reactive
- ❖ Line production
- ❖ Testing
- ❖ Prevent defects