



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

# Introduction to Standards

Presented by  
the International Electrotechnical Commission



## Aim

This presentation was developed by the International Electrotechnical Commission (IEC) to create a better awareness and understanding of the importance of standards for students of business schools and management of technology, and technology policy faculties of technical universities.

It consists of three lectures:

- An introduction to standards and their importance
- A discussion of the life cycle of standards, their development, use and maintenance
- A discussion of the economic value of standards (i.e. their relevance for business, innovation and international trade).

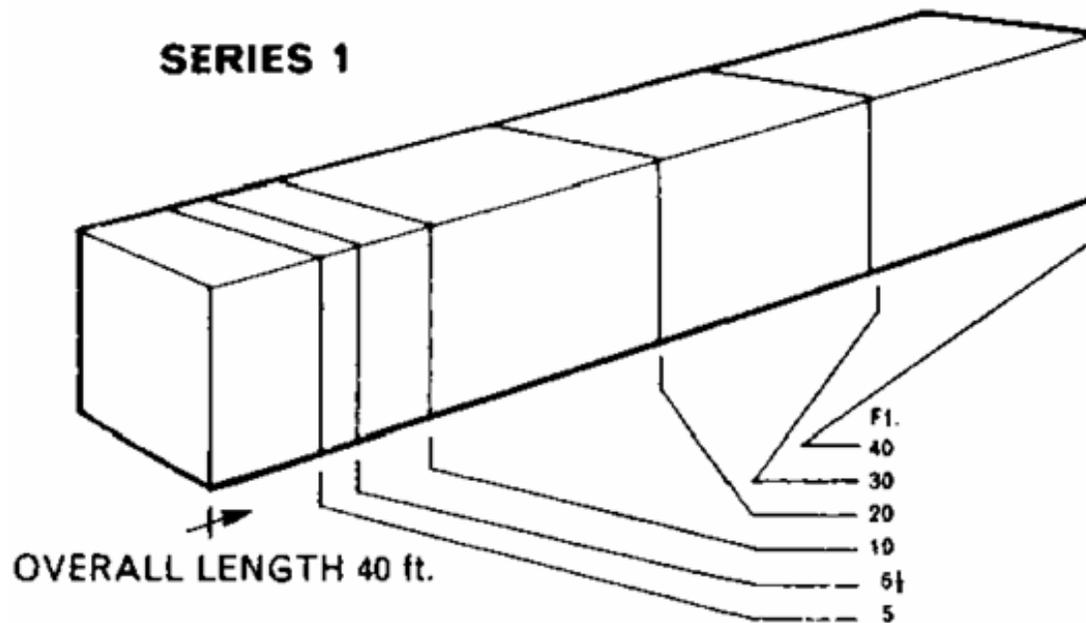
## Contents

- ▶ Standards are everywhere. Examples
- ▶ What is a standard? Definitions
- ▶ Why are standards important?
- ▶ Why participate in making standards?
- ▶ Which types of standard are there? Classifications
- ▶ In-depth example of a standard
- ▶ Summary

## Successful standards go unnoticed

- ▶ Successful standards usually go unnoticed
- ▶ The importance of standards is noticeable when problems arise, e.g.
  - ▶ Incompatible electrical plugs and sockets worldwide
  - ▶ Baltimore fire 1904: Hoses of fire fighters from neighbouring cities did not fit hydrants in Baltimore
- ▶ A lack of standards can lead from mere frustration to needless deaths

Standards are everywhere!  
e.g., ISO freight containers (ISO,1968)



Standards are everywhere!  
e.g., McDonald's Hamburgers



## Standards are everywhere! More examples ...

- ▶ Units of measurement
  - ▶ Length – metre (m)
  - ▶ Mass – kilogram (kg)
  - ▶ Time – second (s)
  - ▶ Electrical current ampère (A)
- ▶ Layout of QWERTY computer keyboard
- ▶ Size of light bulb fitting
- ▶ Paper format (A0, A1.....; height-to-width ratio 1.4142 : 1)
- ▶ GSM protocol for mobile phones
- ▶ Vehicle safety test procedures

## What is a standard?

Mostly used in two rough senses:

- ▶ it is an agreement developed by several parties with the intent that all parties comply
- ▶ it is a product or service with a significant market share

There are many definitions. Most try to specify the first type of standard (i.e. the agreement).

## Many definitions of *standard*

Definition depends on who is asked, e.g.

- ▶ Formal standards bodies: a standard is “**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” (ISO/IEC, 2004b, p.8)
- ▶ Industry: “A standard [can be] **of any form or type** (...). A standard is also **one of the agents used** (...) **to bring about market change**” (Cargill, 1989, p.41)

## Why are standards important? Standards contain *information*

“We live in a world profoundly reliant on product standards”  
(WTO, 2005, p.XXIV)

Standards contain *Information*. *They*

- ▶ Indicate product safety
- ▶ Clarify health risks
- ▶ Clarify environmental risks
- ▶ Increase transparency in the market (consumer and producer expectations)
- ▶ Create a level playing field
- ▶ Reduce information search costs
- ▶ Reduce production costs (allows economy of scale in production)
- ▶ Necessary for diffusion of new technologies

## Why are standards important? Standards create *compatibility*

Compatibility defined as

- ▶ ‘the suitability of products, processes or services for use together under specific conditions to fulfill relevant requirements without causing unacceptable interactions.’ (ISO/IEC, 1991)
- ▶ Two types of compatibility between components (David & Bunn, 1988)
  - compatible complements (e.g. plug and socket)
  - compatible substitutes (e.g. plug A and B in respect to socket)

## Why are standards important? Standards create compatibility (cont.)

- ▶ Standards create *Compatibility*
  - ▶ Networked environments\* like telephone communication and broadcasting require standards
  - ▶ Standards coordinate technology (Schmidt & Werle, 1998)
  - ▶ Standards coordinate markets, e.g. availability of complementary products
  - ▶ Standards facilitate international trade

## Causes for the increasing importance of standards

- ▶ Expansion of global markets
- ▶ Increasing anonymity of markets (standard-compliance raises trust)
- ▶ Increasing concern for safety, health and environmental issues
- ▶ Growing quality consciousness (higher demand for quality standards)
- ▶ Use of standards to protect against mistakes > legal accountability
- ▶ Regulation which encourages the use of standards

## Why participate in making standards? Industry

- ▶ In the area of electrotechnical standardization alone, already 8000 people participate internationally (this excludes those who participate in the national and regional “mirror” standard committees)
- ▶ Why do companies participate? (Cargill, 1989)
  - ▶ A standard is a change agent, a strategic tool to influence the market
  - ▶ Participate if a proposed standard affects their business, responds to a problem, focuses on their market need
  - ▶ Standardization is an effort to guide momentum in the market (p. 69)
    - Creating a standard is a form of collective consensual leadership, leadership by conviction
  - ▶ Standard is a guidepost that points towards the future of a market.
    - It provides predictability to business (p. 48)
    - It provides constancy to user operation (p. 70)

## Why participate in making standards? Consumers

Why do consumer organizations participate?

(WTO, 2005, p. XXVII):

- ▶ Standards are important for consumer goods like food, drugs, vehicles, electrical appliances, safety equipment
- ▶ Standard requirements regarding design (toys), ingredients (paint), process of manufacture or production (meat), performance (helmets)

## Why participate in making standards? Consumers (cont.)

“Consumers expect that services and products will be consistent in quality, durability and ease of use. International Standards are voluntary rules and guidelines that help to ensure:

- ▶ safer, healthier, more environmentally sound products and services;
- ▶ products with improved quality and reliability;
- ▶ better operational compatibility between products and greater consistency in the delivery of services;
- ▶ improved choice and access to goods and services;
- ▶ lower costs for consumers;
- ▶ better product or service information.” (ISO/IEC, 2003)

## Why participate in making standards? Government

Governments need standards for

- ▶ Regulation (e.g. minimum standards for consumer protection)
  
- ▶ Economic growth
  - ▶ Information and compatibility
  - ▶ Education on standardization is part of the national economic strategy (e.g. Asian countries)

## Why NOT participate in standards making?

Who does not want standards

- ▶ Those with a stake in the status quo (e.g. company with a large market share in the area of standardization)
- ▶ These parties sometimes participate in order to frustrate the standards process

## Many kinds of standards

- ▶ Terminology standards
- ▶ Safety standards
- ▶ Health standards
- ▶ Procedural standards
- ▶ Compatibility standards
- ▶ Etc.

## Many kinds of standards: Classifications

Classifications related to (e.g. de Vries, 2006):

- ▶ Subject matter
- ▶ Standard development
- ▶ Standard use

Focus in following on compatibility standards\*, an important category in subject-matter oriented classifications

## Many kinds of standards: Classifications (cont.)

The following main classifications are discussed in the next slides:

- ▶ What aspect is standardized? (subject matter classification)
  - ▶ **Product and performance standards**
- ▶ What type of standard is at stake? (standard development classification)
  - ▶ ***De facto and de jure standards***
- ▶ When does standardization take place? (standard development classification)
  - ▶ **Anticipatory - Enabling - Responsive standardization**

## What aspect is standardized? Product vs. performance standards

- ▶ *performance standards* (ISO/IEC, 2004b): standards that specify the required performance of a product or service
- ▶ **IEC 61753 – Fibre Optic Interconnecting Devices**
- ▶ *product specifications* (ISO/IEC, 2004b): design or descriptive characteristics of a product or service
- ▶ **IEC 60908 – Compact Disc Digital Audio System**

In general, *product specifications* restrict technology development more than *performance standards*

## What type of standard is at stake? *De facto* standard

- *De facto* versus *de jure* standards incorrectly explained as *market-* versus *committee-based standards*
- *De facto* means: in practice, in reality
  - **de facto standard**: product or service with a large market share
  - Incorrectly associated with (a) proprietary standards [whereas non-propr. Specs, e.g. open source, can also become *de facto* standards]
  - Incorrectly (b) *solely* associated with market standards [whereas committee standards can also become *de facto* standards]

## What type of standard is at stake? *De jure* standard

- *De jure* means: by law, by regulation
  - *de jure standard*: standard imposed by law
  - Incorrectly associated with (a) *all* committee-based standards of formal standards bodies [whereas only a very small proportion of formal standards is referenced in law]
  - Incorrectly associated with (b) *non* market-based standards [whereas standards committees are usually dominated by industry]

## What type of standard is at stake? *De facto vs. de jure* standards

- ▶ Dilemma: use the seemingly opposing terms *de facto* and *de jure* standards?
- ▶ Core message: for both *de facto* and *de jure* standards the ultimate goal is not to develop a standard document but to achieve wide adoption and **de facto compatibility**\*.

## When does standardization take place? Anticipatory – Responsive standardization

- ▶ Anticipatory standardization
  - ▶ standardize before technology has been developed and marketed
- ▶ Enabling standardization
  - ▶ Parallel standards and market development
- ▶ Responsive standardization
  - ▶ standardize technology variety available on the market

## In-depth example of a standard: ISO/IEC 11801 – Home Cabling

- ▶ Why was it developed?
- ▶ How was it developed?
- ▶ What does the standard look like?
- ▶ What impact has the standard had?

The standard is available on CD for educational purposes.

## ISO/IEC 11801 – Introduction

### Why was it developed?

“Within customer premises, the importance of the cabling infrastructure is similar to that of other fundamental building utilities such as heating, lighting and mains power. As with other utilities, interruptions to service can have a serious impact. Poor quality of service due to lack of design foresight, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organization's effectiveness.” (ISO/IEC 11801, p.11 )

## How was it developed? Procedures for standard development (ISO/IEC, 2004b)

1. Preliminary Stage
2. Proposal Stage
3. Preparatory Stage
4. Committee Stage: outcome is a Committee Draft
5. Enquiry Stage:
  - submitted to all National Committees for voting (5 months)
  - Preparation of Final Draft International Standard (FDIS)
6. Approval Stage: FDIS sent to all National Committee for voting (2 months)
7. Publication Stage: outcome International Standard



## ISO/IEC 11801 – What does it look like?

**INTERNATIONAL  
STANDARD**

**ISO/IEC  
11801**

Second edition  
2002-09

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**Information technology –  
Generic cabling for customer premises**

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## ISO/IEC 11801. What was its impact?

The standard has a significant impact.\*

What was its impact on

- ▶ Architects?
- ▶ Electrical contractors?
- ▶ Cable manufacturers?
- ▶ Components?

## Exercise: Applying Classifications to ISO/IEC 11801

Is ISO/IEC 11801

- ▶ a product or performance standard?
- ▶ a *de facto* or *de jure* standard – given the difficulty of the terms?
- ▶ an anticipatory, enabling or responsive standard?

## Summary

- ▶ There are many types of standard
- ▶ Standards are everywhere
- ▶ Standards influence everything we do
- ▶ Participating in standards development can therefore be very important for companies, consumers and government



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