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Documentation for measurement standards and
calibration devices

Documentation pour les étalons et les dispositions d'étalonnage



Foreword

The International Organization of Legal Metrology (OIML) is a worldwide, intergovernmental organization whose primary aim is to harmonize the regulations and metrological controls applied by the national metrological services, or related organizations, of its Member States.

The two main categories of OIML publications are:

- **International Recommendations (OIML R)**, which are model regulations that establish the metrological characteristics required of certain measuring instruments and which specify methods and equipment for checking their conformity; the OIML Member States shall implement these Recommendations to the greatest possible extent;
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International Recommendations and International Documents are published in French (F) and English (E) and are subject to periodic revision.

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DOCUMENTATION for MEASUREMENT STANDARDS and CALIBRATION DEVICES

CHAPTER 1

1.0. Introduction

This International Document deals with the documentation for measurement standards and calibration devices ^(*).

By documentation is meant a set of documents which should be provided with each measurement standard or calibration device when these are used for metrological purposes in a given country.

This International Document defines the main characteristics of the documentation, gives general principles which are recommended to be used when the documentation is being prepared and provides for a maximum range of the documentation. The owner and user of a standard may choose from it the appropriate items according to the level, importance and field of use of the standard in conformity with applicable national regulations.

The Appendix gives an example of one possible form of the documentation, its structure, and the information contents of the various documents.

1.1. Object

The object of this International Document is to define the documentation for standards, its main characteristics and the principles to be followed in its preparation.

1.2. Scope

This International Document applies to the documentation for standards used for metrological purposes and prepared in conformity with the regulations in a given country.

All the provisions of this International Document apply equally to measurement standards and to calibration devices.

1.3. Definitions

1.3.1. Documentation for a standard

The set of documents concerning a standard.

1.3.2. Document for a standard ^(**)

The durable record of important information concerning a standard, the manner of its conservation and use.

A distinction is made between legal, technical and metrological documents, depending on the nature of their contents.

(*) Referred to as « documentation for standards » in the text hereafter.

(**) Referred to as « document » in the text hereafter.

1.3.3. Validity of a standard

The status attained by a standard after attributing to it the ability to fulfil its purpose as determined in conformity with applicable regulations.

The validity of the standard is expressed by its legal and metrological documents.

1.3.4. Validity of a document

The property of a document guaranteeing that the data it contains are correct.

1.3.5. Accessibility of a document

The property of a document characterised by the ease with which the document can be located and obtained.

CHAPTER 2

2. Documentation for a standard

The purpose of documentation is:

- to bring together important information concerning a standard,
- to specify conditions for long-term conservation of the capacity of the standard to serve its function,
- to facilitate the verification of compliance with the specified conditions.

The provision of adequate documentation for standards is a very important part of any legal metrology program. Furthermore, harmonization in both the type and the format of information included in documentation promotes and facilitates the international exchange of data on standards and the intercomparison of measurement methods and results. The complete documentation serves as a part of the legal protection of the owner and user of the standard or of other persons and organizations concerned.

2.1. The main characteristics of documentation are the following:

- information content of the documentation,
- validity of the documents,
- accessibility of the documents.

2.1.1. The information content of the documentation includes:

- description of the standard,
- validity of the standard,
- requirements for ensuring the proper functioning of the standard and conditions of its use.

2.1.1.1. The description of the standard includes important legal, technical, and metrological information concerning the standard as well as other information connected with its conservation and use.

This includes especially:

- identification marks of the standard (name, identification number),
- type of the standard (quantity),
- purpose of the standard (intended function of a given device),
- conditions and restrictions on the use of the standard,

- accuracy of realization of the unit, range, traceability,
- principle of operation and construction of the standard,
- description of the standard as a whole,
- description of modifications carried out on the standard.

2.1.1.2. The validity of the standard may be:

- a) legal,
 - b) metrological.
- a) The legal validity is made known by legal documents which make a given device legally valid for a specified period as a standard for a given value of a particular quantity. Examples of such documents are the approval document of the standard and its registration document.
 - b) The metrological validity is made known by documents confirming the validity of the metrological characteristics of a standard, e.g. calibration certificate, verification certificate, uncertainty statement of a standard with reference to the national standard (traceability).

2.1.1.3. The requirements for ensuring the proper functioning of the standard and conditions of its use, that is to say, the conservation of the long-term capacity of the standard to serve its function include:

- a) the regulations concerning :
 - conditions of conservation of the standard and control of compliance with these conditions,
 - maintenance and control of the standard,
 - use of the standard,
 - safeguarding of the standard,
- b) the systematic records concerning :
 - control of compliance with the conditions of conservation of the standard,
 - maintenance and control of the standard,
 - use of the standard.

2.1.2. Validity is attributed to the document in an appropriate manner, for example by:

- signatures of authorized persons and official stamps of organizations concerned,
- statement of an expiration date, if any,
- reference to special steps or special provisions concerning retention, loss, or extension of validity,
- reference to laws or regulations which either require the document in question or prescribe its content,
- reference to important technical information, e.g. traceability of the standards to national standards.

Validity may be attributed to the document in more than one way, depending on the character of the document and on the need of ensuring the validity of the standard.

A document loses its validity if it is out of date or if its information content is no longer correct.

2.1.3. Accessibility of the document should comply with the following requirements :

- immediate access for persons authorized to handle them,
- access for persons with legitimate interest in the information contained in the documentation,
- possible access for other persons in conformity with the customs of a given country.

2.2. Principles of preparation of the documentation

It is recommended that the following principles be followed when preparing the documentation.

2.2.1. General principles :

- a) documentation should be as simple and clear as possible; it should contain only significant information,
- b) documentation should be complete keeping in mind its main characteristics,
- c) documentation should comprise the smallest possible number of documents that will effectively serve its purpose,
- d) documentation should, as far as possible, reflect the needs and concerns of all interested persons and organizations.

2.2.2. In general, the following types of documents are distinguished:

- a) individual documents referring to a single standard, e.g. a document concerning the official approval of a standard,
- b) collective documents with contents common to a certain number of standards.

2.2.3. Form of documents:

- a) written documents,
- b) film, photocopies,
- c) modern means of information storage (punch tape, magnetic tape, magnetic disk, etc.).

In specific cases, the form of documents permitted will depend on national or other legal requirements.

Documents in the form of recorded sound are not recommended.

2.2.4. Selective approach

In the preparation of the documentation for a standard, one should adopt a selective approach. It will depend on the level, function and importance of the standard concerned.

It can be said that in general the documentation for a standard of a higher level (in the hierarchy scheme for a given quantity) is more detailed and more extensive than that for a standard of a lower level.

The number of documents may be reduced as the level of the standards decreases. It should be noted that the selective approach does not apply to the main characteristics of documentation. (The type of the information may be changed provided that the requirements in point 2.1. are complied with regardless of the level of the standard).

2.3. Safeguarding of the documentation

Safeguarding the documentation means preventing its loss, its deterioration or loss of value, its destruction, and unauthorized tampering with it.

- 2.3.1. The degree of safeguarding to be given to a document depends upon its value, the manner of safeguarding depends upon its nature.
- 2.3.2. Particularly valuable documents may be copied. The originals can then be kept safe while the copies are in general use.
- 2.3.3. In certain cases it may be desirable to keep records of the location of specific documents and of the persons responsible for them.

APPENDIX

EXAMPLE OF THE DOCUMENTATION FOR A STANDARD

Introduction

To clarify the characteristics of documentation and the principles for the preparation of the documentation, mentioned in a general way in the International Document, an example of one possible form of documentation and its structure is given in this Appendix. It contains examples of various documents with their information content. These examples should be understood as an illustration of one of several possible ways to prepare the documentation. The choice of the structure of the documentation and its information content depends on the requirements, practice, and needs of each country.

Structure of the documentation for a standard:

- A.1 record card of the standard,
- A.2 documents concerning the legal validity of the standard,
- A.3 documents concerning the metrological validity of the standard,
- A.4 documents concerning the conservation of the standard,
- A.5 documents concerning the use of the standard,
- A.6 records concerning the control of the standard,
- A.7 records concerning the use of the standard,
- A.8 technical documents.

To make checking of the completeness of the documentation simple and rapid, it is recommended to prepare a list of documents. The list should be signed by the responsible person and added to the documentation.

A.1 Record card of the standard

The record card contains the most essential information concerning a standard. It makes possible identification of the standard, gives a general idea of its main metrological characteristics, etc. This document is important in that it is the only one in the set of documents which must accompany the standard at all times.

The record card may contain the following information:

- A.1.1 number of the record card of the standard,
- A.1.2 name of the standard,
- A.1.3 intended use of the standard,
- A.1.4 construction of the standard and accessories,
- A.1.5 serial number of the standard,
- A.1.6 year of manufacture of the standard,
- A.1.7 name and address of manufacturer of the standard,
- A.1.8 main metrological characteristics of the standard, its value, and its range,
- A.1.9 assigned hierarchical level or assigned function; date of assignment of hierarchical level to the standard or date of assignment of its function; name of organization authorized to assign the hierarchical level to the standard; name and signature of its representative, seal of the organization,

A.1.10 location of the standard (organization, laboratory in which the standard is located), person responsible for the standard,

A.1.11 hierarchy scheme for the quantity, graphically showing the position of the standard,

A.1.12 name of the organization which has calibrated (or verified) the standard.

A.2 Documents concerning the legal validity of the standard

These documents are, for example, the documents assigning to the standard its position in a hierarchy scheme.

A.3 Documents concerning the metrological validity of the standard

These documents are, for example, the calibration certificates, verification certificates, reports of the results of national and international comparisons.

A.4 Documents concerning the conservation of the standard

These documents fix the conditions of the environment in which the standard is kept for any extended period. They also lay down the required environmental controls, control of the standard itself, qualification of personnel and safeguarding measures.

These documents may contain the following information:

A.4.1 name of the standard,

A.4.2 number of the record card of the standard,

A.4.3 required environmental conditions for the conservation of the standard:

- a) temperature and permissible temperature variations,
- b) humidity and permissible humidity variations,
- c) ambient pressure and permissible pressure variations,
- d) permissible levels of radiation,
- e) suppression of interference (e.g., electromagnetic disturbances),
- f) voltage stabilization of the power supply,
- g) protection of the standard against vibration,
- h) measures to be taken to prevent destruction of the standard (fire, water) or its theft,
- i) cleanliness of the environment and measures concerning its maintenance,

A.4.4 requirements concerning the control of the standard:

- a) inspection procedures for determining the technical condition of the standard,
- b) periodicity of technical condition inspections of the standard,
- c) procedures for metrological control of the standard,
- d) periodicity of metrological controls of the standard,
- e) procedures for legal control of the standard,
- f) periodicity of legal controls of the standard,

A.4.5 safeguarding measures:

- a) measures to be taken to protect the standard against damage, tampering, theft,
- b) measures to be taken in the event of the standard being moved,

- c) measures to be taken in the event of the standard being moved in an emergency (fire, flood, or any other unforeseen situation),
- d) measures to be taken in the event of the standard being out of service for an extended period,

A.4.6 name of the organization which approved the requirements concerning the conservation of the standard, date, name and signature of the person responsible, and seal of the organization.

A.5 Documents concerning the use of the standard

These documents fix the procedures to be followed when using the standard, precautions to be taken when working with the standard, and methods for treating the data obtained during calibration or verification of standards of lower hierarchical level.

These documents may contain the following information:

A.5.1 name of the standard,

A.5.2 number of the record card of the standard,

A.5.3 operating instructions for the standard while it is in use for the calibration or verification of standards of lower hierarchical level,

A.5.4 measures which have to be taken when the standard is in use (for example, list of operations requiring the presence of the person responsible for the standard, number of persons required to be present, protective aids),

A.5.5 methods of treating (evaluating) the data obtained during calibration or verification of standards of lower hierarchical level, methods for determining measurement errors,

A.5.6 precautions to be taken for the safety of personnel during use of the standard.

A.6 Records concerning the control of the standard

These records generally relate to logging the results of control in connection with the conservation of the standard and its technical state. Records give an overview of the technical state of the standard in the light of the requirements concerning the conservation of the standard.

These records may contain the following information:

A.6.1 name of the standard,

A.6.2 number of the record card of the standard,

A.6.3 date on which control took place,

A.6.4 type of control (inspection, calibration, international comparison),

A.6.5 results of control:

- a) in the case of an inspection, note on any changes in the technical state of the standard,
- b) in the case of metrological control, statement of the values of the evaluated metrological characteristics,
- c) in the case of legal control, statement on compliance with all requirements from a legal metrology point of view,

A.6.6 conclusions of control:

in the case of an inspection, a statement on compliance of the standard with the technical requirements concerning its future use.

A.7 Records concerning the use of the standard

The records on the use of the standard are part of the records concerning the standard. One can include the names of persons who have used the standard, the dates, and the purpose of each use.

These records may contain the following information:

- A.7.1 name of the standard,
- A.7.2 number of the record card of the standard,
- A.7.3 purpose of the work with the standard (calibration, verification of standards of lower hierarchical level),
- A.7.4 period of use of the standard (from ... to ...),
- A.7.5 owner of the calibrated (or verified) standard,
- A.7.6 principal conclusions of verification (or calibration), concerning the verified (calibrated) standard,
- A.7.7 name and signature of the person who worked with the standard,
- A.7.8 notes (remarks concerning observed characteristics of the standard, other observations or information).

A.8 Technical documents

These are documents containing important technical information concerning the standard, for example:

- A.8.1 description of the operation of the standard,
- A.8.2 technical and engineering drawings of the standard,
- A.8.3 assembly of the standard,
- A.8.4 maintenance manual prepared by the manufacturer of the standard,
- A.8.5 list of scientific or research papers and publications concerning the standard.

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