

BASIC
PUBLICATION

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Directives for OIML technical work.

Part 2: Guide to the drafting and presentation
of OIML publications

Directives pour les travaux techniques de l'OIML.

Partie 2: Guide pour la rédaction et la présentation
des publications de l'OIML



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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 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. OIML Member States shall implement these Recommendations to the greatest possible extent;
- **International Documents (OIML D)**, which are informative in nature and which are intended to harmonize and improve work in the field of legal metrology;
- **International Guides (OIML G)**, which are also informative in nature and which are intended to give guidelines for the application of certain requirements to legal metrology; and
- **International Basic Publications (OIML B)**, which define the operating rules of the various OIML structures and systems.

OIML Draft Recommendations, Documents and Guides are developed by Project Groups linked to Technical Committees or Subcommittees, which comprise representatives from OIML Member States. Certain international and regional institutions also participate on a consultation basis. Cooperative agreements have been established between the OIML and certain institutions, such as ISO and the IEC, with the objective of avoiding contradictory requirements. Consequently, manufacturers and users of measuring instruments, test laboratories, etc. may simultaneously apply OIML publications and those of other institutions.

International Recommendations, Documents, Guides and Basic Publications are published in English (E) and translated into French (F) and are subject to periodic revision.

Additionally, the OIML publishes or participates in the publication of **Vocabularies (OIML V)** and periodically commissions legal metrology experts to write **Expert Reports (OIML E)**. Expert Reports are intended to provide information and advice, and are written solely from the viewpoint of their author, without the involvement of a Technical Committee or Subcommittee, nor that of the CIML. Thus, they do not necessarily represent the views of the OIML.

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OIML Publications may be downloaded from the OIML web site in the form of PDF files. Additional information on OIML Publications may be obtained from the Organization's headquarters:

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1 Scope

- 1.1 This part of the Directives provides instructions for the drafting and presentation of OIML publications.
- 1.2 The rules of this Basic Publication are intended to ensure that all OIML publications are presented in as uniform a manner as possible.
- 1.3 They apply only when they are relevant.

2 General principles for drafting and presenting OIML publications

2.1 Objective

- 2.1.1 The objective of OIML Recommendations concerning any given type of measuring instrument is to formulate requirements for the instrument and for its metrological control. OIML Recommendations serve as the basis for metrological regulations in OIML Member States after translation of these requirements into the official language of the country concerned.
- 2.1.2 Recommendations shall also serve as a basis for issuing OIML Certificates under the *OIML Certificate System for Measuring Instruments*.
- 2.1.3 To achieve this objective, the requirements of a Recommendation shall
 - a) be unambiguous,
 - b) be as complete as necessary within the limits specified by the scope of the Recommendation,
 - c) be consistent, clear and accurate,
 - d) take full account of the state of the art,
 - e) be written in such a way as not to obstruct future technological developments,
 - f) be comprehensible to qualified persons who have not participated in their elaboration.
- 2.1.4 Other types of OIML publications are developed for different purposes, but the objectives specified in the bullet points above shall still be followed, as applicable.

2.2 Style

The style of OIML publications shall be as simple and concise as possible so that they can be easily understood by all readers. This is particularly important for readers whose mother tongue is not that of the publication.

2.3 Homogeneity

- 2.3.1 Uniformity of structure, style, and terminology shall be maintained within each publication, as well as within a series of associated publications. As far as possible, the structure of associated publications and the numbering of their elements shall be identical.
- 2.3.2 The same term or wording shall be used throughout each publication or series of publications to designate a given concept. The use of an alternative term (synonym) for a concept already defined shall be avoided. As far as possible, only one meaning shall be attributed to each term chosen.
- 2.3.3 It is important to respect these requirements to ensure understanding of the publication and to take maximum advantage of word processors and computer-aided translation.

- 2.3.4 The spelling of English texts shall be consistently British or US throughout all parts of a given Recommendation. Words and expressions which have different significations according to British and US usages shall be avoided whenever possible; when this is not possible, a word of the same meaning in the other language variant should be given in parentheses: for example, ground (earth), aerial (antenna). Local idiomatic expressions should also be avoided. Dictionaries are available that identify words and usages that are confined mainly to one part of the world.
- 2.3.5 New words or meanings that have not yet entered the standard dictionaries shall be avoided when possible and if they are used, they shall be defined in the text.

2.4 Coherence of publications

The text of every publication shall follow the relevant provisions of other existing OIML publications and those of other international organizations (especially those of the Metre Convention, ISO and the IEC), so as to achieve coherence across the full range of OIML publications. This relates particularly to the following:

- a) terms and definitions;
- b) quantities, units and their symbols;
- c) expression of errors and uncertainties;
- d) accuracy classes;
- e) abbreviations;
- f) bibliographic references;
- g) environmental conditions and associated tests;
- h) safety.

2.5 Editing of the final Committee Drafts

Secretariats are recommended to set up an editing committee including English native speakers to ensure that their final CDs are of the highest quality possible before they are sent to the BIML for submission to the CIML for approval.

2.6 Implementation

- 2.6.1 The text of an OIML Recommendation shall be drafted so as to permit its direct application and to facilitate its adoption as a national metrological regulation without the need for modifications. The same principle shall be used for other OIML publications.
- 2.6.2 Statements such as “the requirements are subject to national legislation” may present a technical barrier to international trade.

2.7 Planning

In order to ensure the timely issue of a publication or series of associated publications, a list of all aspects to be covered shall be made before detailed drafting begins. This aspect of the planning stage ensures the establishment of the scope and structure of the publication(s) as well as the interrelationships involved.

3 Structure of OIML publications

3.1 Recommendations

3.1.1 A Recommendation concerned with a type of measuring instrument includes, in general, the following elements:

Title page

Contents

Foreword

Introduction

Scope

Terms and definitions

Description of the category of instrument

Units of measurement

Metrological requirements

Technical requirements

Metrological controls

Test method and model test report

Practical instructions

Mandatory annexes

Informative annexes

Footnotes

Notes integrated in the text

Notes to tables and figures

3.1.2 According to the nature of the instrument or its use, some Recommendations may not include all of the above-mentioned elements. Nevertheless, underlined elements of 3.1.1 are obligatory in every Recommendation, or series of Recommendations dealing with the same subject. It may be decided, for practical reasons, to draft several Recommendations which cover the different elements separately. Finally, in order to take account of the work already accomplished by other international institutions, it may be decided to refer to this work, therefore limiting the contents of a Recommendation to certain elements.

3.1.3 All elements, except footnotes and notes, shall follow the order indicated above.

3.1.4 The content of each element is described in clause 4 below.

3.2 Other publications

3.2.1 Other OIML publications cover a wide range of applications. However, in general, they will contain the following elements:

Title page

Contents

Foreword

Introduction

Scope

Terms and definitions
Publication text as appropriate
Mandatory annexes
Informative annexes
Footnotes
Notes integrated in the text
Notes to tables and figures

- 3.2.2 The exact composition of each publication will vary considerably, but the underlined elements of 3.2.1 are obligatory in every OIML publication, or series of publications dealing with the same subject.
- 3.2.3 All elements, except footnotes and notes, shall follow the order indicated above.
- 3.2.4 The content of each element is described in clause 4 below.

4 Content of the individual elements of an OIML publication

4.1 Title page

- 4.1.1 The BIML shall prepare the title page in a standard format. Similarly, the number of all OIML publications shall be allocated by the BIML (e.g. in the form: R 76, D 11, B 6, etc.).
- 4.1.2 The title should be as concise as possible while permitting a comprehensible overview of the scope of the publication. It should not be so broad as to cover more than the scope of the publication.

4.2 Contents

The contents shall list the elements of the publication and indicate their page numbers.

4.3 Foreword

- 4.3.1 The BIML shall prepare a Foreword after the publication has been approved by the CIML. This shall include general information about the OIML and its publications as well as a specific section which shall give the following information, as appropriate:
- a) an indication of the Technical Committee or Subcommittee responsible for the publication;
 - b) information about the CIML approval and Conference sanction of the publication;
 - c) publications cancelled or replaced (in whole or in part) by the current publication;
 - d) the relationship with other publications.
- 4.3.2 At the draft stage of a publication, an explanatory note may replace the Foreword. This shall be replaced by the Foreword on final publication.

4.4 Introduction

- 4.4.1 The introduction is an optional element, used if it is necessary to present specific information about
- a) the technical content of the publication,
 - b) the reasons leading to its preparation, or
 - c) any significant technical changes from the previous edition of the publication, if appropriate.
- 4.4.2 The introduction shall not contain requirements.

4.5 Scope

- 4.5.1 The scope shall appear at the beginning of every publication to clearly define the subject and its aspects to be covered, thereby indicating the limits of the publication's application. It may make specific exclusions to further clarify the aspects to be covered.
- 4.5.2 The scope shall not contain requirements.

4.6 Terms and definitions

- 4.6.1 The terms and definitions element provides the necessary definitions for understanding certain terms used in the publication. If the terms and definitions are informative, they shall be given in an informative annex.
- 4.6.2 Rules for the drafting and presentation of terms and definitions are given in Annex A of this Basic publication. Special attention should be paid to A.1.2 and A.1.3.9.
- 4.6.3 The terms and definitions may include a subclause explaining symbols and abbreviations used in the publication.
- 4.6.4 If a term is already defined in one of the OIML Vocabularies this shall not be given another definition in an OIML Recommendation or other OIML publication.

4.7 Description of the instrument category

- 4.7.1 This element provides a brief description of the quantity measured, the design features, component parts, and function of the instrument covered by the publication. Only such detail as is required for the comprehension of the publication's other elements shall be used.
- 4.7.2 This element shall not contain requirements and may be supplemented by informative annexes.

4.8 Units of measurement

The units of measurement in which the given instrument's measurement results will be presented, as well as their symbols, shall conform with the decisions of the General Conference of Weights and Measures (CGPM), OIML D 2:2007 *Legal units of measurement*, and, if necessary, the detailed specifications of the appropriate part of ISO/IEC 80000¹.

4.9 Metrological requirements

This element shall include the metrological requirements with which measuring instruments shall comply during the controls mentioned in 4.11, for example maximum permissible errors, influence quantities and environmental conditions. As far as possible, requirements in this element shall follow the guidance in OIML D 11:2004 *General requirements for electronic measuring instruments*.

¹ The responsibility for each part of this publication lies with either ISO or the IEC depending upon the subject area. The publication dates are also different for each part.

4.10 Technical requirements

Technical requirements given in this element shall be confined to the necessary minimum and shall be specified so as to ensure compliance with the metrological requirements, e.g. requirements for construction, security of operation, protection against fraud, ease of reading, and descriptive markings.

4.11 Metrological controls

This element shall specify the requirements concerning the following:

- a) type approval (submission procedure, descriptive documents, tests to be conducted, etc.);
- b) appropriate initial and subsequent verifications (control methods and equipment to be used, tests to be conducted, etc.);
- c) other appropriate metrological supervision.

4.12 Test methods

4.12.1 This element shall give instructions concerning the test procedure for checking compliance with the stated metrological and technical requirements with a view to ensuring the reproducibility of the test results.

4.12.2 This element may be subdivided in the following order (where appropriate):

Principles

Test equipment

Preparation for tests

Test procedure

Presentation of results, including the method of calculation and the uncertainty of the test method

4.12.3 The test methods may be presented in a mandatory annex.

4.13 Test report format

4.13.1 This element shall describe how to state the test results in an internationally harmonized manner.

4.13.2 The test report format applies to type evaluation (and is therefore essential for the *OIML Certificate System for Measuring Instruments* and the MAA) and may also apply to verification.

4.13.3 The test report format may be presented in a separate part of the Recommendation.

4.14 Practical instructions

In this optional element, provisions that are applicable to the instrument after its manufacture may be given (e.g. instructions for installation, use or maintenance).

4.15 Mandatory annexes

Mandatory annexes are integral parts of the publication. The fact that an annex is mandatory (as opposed to informative) shall be made clear by its reference in the text and by an indication at the beginning of the annex itself. Annexes shall appear in the publication in the order in which they are referred to in the text.

4.16 Informative annexes

- 4.16.1 Informative annexes give additional information, and are placed after the mandatory elements of a publication. They shall not contain requirements. The fact that an annex is informative (as opposed to mandatory) shall be made clear by its reference in the text and by an indication at the beginning of the annex itself.
- 4.16.2 A bibliography is a type of informative annex and should be the last informative annex.

4.17 Footnotes

- 4.17.1 Footnotes give additional information. Their use shall be kept to a minimum and they shall not contain requirements. A footnote may appear only in one language version of a publication if it is necessary to make an explanation only for linguistic reasons.
- 4.17.2 Footnotes shall be placed at the foot of the relevant page and be separated from the text by a short, thin, horizontal line on the lower left side of the page.
- 4.17.3 Footnotes shall normally be distinguished by Arabic numerals (1, 2, 3, etc.), starting afresh on each page or forming a continuous numerical sequence throughout the document. The footnotes shall be referred to in the text by inserting the same numerals, as superscripts, after the word or sentence in question (¹, ², ³, etc.).
- 4.17.4 In certain cases, for example in order to avoid confusion with superscript numbers, one or more asterisks may be used instead: *, **, ***, etc.

4.18 Notes and examples integrated in the text

- 4.18.1 Notes and examples integrated in the text of a Recommendation may be used only for giving information that is essential to the comprehension of the document. They shall not contain requirements. They may be part of any element except the title page and footnotes.
- 4.18.2 Notes and examples should normally be placed after the paragraph, table or figure to which they refer, and are not numbered unless more than one appears in the same clause, subclause, figure or table.
- 4.18.3 Individual notes or examples shall be preceded by the title “*Note:*” or “*Example:*” as appropriate, placed at the beginning of the first line of the text of the note or example.
- 4.18.4 When several notes or examples occur within the same clause, subclause, figure or table, they shall be designated “*Note 1:*”, “*Note 2:*”, “*Note 3:*”, etc. or “*Example 1:*”, “*Example 2:*”, “*Example 3:*”, etc. as appropriate. The numbering sequence shall be restarted for each group of notes.
- 4.18.5 All lines of a note shall be inset from the margin of the main text by so that the extent of the note can be clearly identified.

5 Divisions and subdivisions

The terms that shall be used to designate the divisions and subdivisions that a Recommendation may have are shown in Table 1.

Table 1 - Names of divisions and subdivisions

Name	Example of numbering
part	R 76-1
section	I, II, etc.
clause	1, 2, etc.
subclause	1.1, 1.2..., 1.1.1, 1.1.2, etc.
paragraph	no numbering

5.1 Part

5.1.1 A part is one document belonging to a series of documents published separately under the same publication number.

5.1.2 The number of a part shall be indicated by an Arabic numeral following the publication number and preceded by a hyphen; for example

OIML R 76-1

5.1.3 The title page of a part shall be prepared by the BIML as described in 4.1.

5.1.4 When a publication comprises two or more separate parts, the first part shall include in its Foreword a description of the intended structure of the entire publication.

5.2 Section

5.2.1 For practical reasons, it may be desirable to subdivide a lengthy publication into sections. In such cases, the sections shall be numbered using Roman numerals.

5.2.2 The numbering of sections shall not prevent the numbering of clauses in an uninterrupted series throughout the publication.

5.3 Clause

5.3.1 A clause is the basic component in the subdivision of the text of a publication.

5.3.2 The clauses in each publication or in its parts shall be numbered with Arabic numerals, beginning with 1. The numbering shall be continuous up to but excluding any annexes. Each clause shall have a title which appears immediately after its number and on a separate line from the text which follows.

5.4 Subclause

5.4.1 A subclause is a numbered subdivision of a clause. A subclause may have further numbered subdivisions. Excessive subdivision should be avoided.

5.4.2 Subclauses shall be numbered with Arabic numerals.

- 5.4.3 Numbering shall not be used to create a subclause unless there is at least one further subclause at the same level. For example, text in clause 1 shall not be designated subclause 1.1 unless there is also a subclause 1.2.
- 5.4.4 Each subclause may be given a title, which shall be placed immediately after its number, on a separate line from the text which follows. However, the use of titles shall be uniform, i.e. all subclauses within one clause shall bear a title or all shall be untitled. In the absence of titles, key terms or phrases appearing at the beginning of the text of the subclause may be used to call attention to the subject matter dealt with in the various subclauses.

5.5 Paragraph

A paragraph is an unnumbered subdivision of a clause or subclause.

5.6 Annexes

- 5.6.1 For the description of the two types of annex, see 4.15 and 0.
- 5.6.2 Annexes shall be designated by the capital letters of the Latin alphabet, in sequential order beginning with A but omitting I and O. When a publication contains only one annex, it shall be designated “Annex A”.
- 5.6.3 The title of an annex shall consist of the word “Annex” followed by a sequential letter (e.g. “Annex A”), followed on the next line by its title (e.g. “Bibliography”), and on the third line by “(Mandatory)” or “(Informative)” as appropriate.
- 5.6.4 Numbers given to the clauses, subclauses, tables, figures and equations of an annex shall be preceded by the letter assigned to that annex (e.g. “A.1.2”, “Table A.1”, “Figure A.1”). Each annex shall be numbered independently.

6 Editorial details

6.1 Text of the publication

6.1.1 Verbal forms for the expression of requirements

- 6.1.1.1 The user of a publication must be able to identify mandatory requirements and to distinguish these requirements from other provisions for which there is a certain freedom of choice. Therefore, it is essential to establish clear rules for the use of verbal forms.
- 6.1.1.2 In Annex B, the verbal form that shall be used to express each kind of provision is given in the first column of each table. The equivalent expressions which are given in the second column shall only be used in exceptional cases when, due to linguistic reasons, it is impossible to use the first form.

6.1.2 Lists

- 6.1.2.1 Lists may be introduced in two ways:
- a) by a complete grammatical clause followed by a colon, in which case each item of the list is ended with a semicolon and the last item of the list is ended with a full stop (period) - see example 1; or
 - b) by the first part of a clause without a colon, completed by the items in the list, in which case each item of the list is ended with a comma and the last item of the list is ended with a full stop (period) - see example 2.

Example 1:

The Recommendation gives the requirements that are specific to the following measuring assemblies:

- fuel dispensers for motor vehicles;
- measuring assemblies for unloading ships' tanks;
- measuring assemblies for milk.

Example 2:

An automatic zero-setting device shall operate only when

- the instrument is in stable equilibrium, or
- the indication has remained stable below zero for at least 5 seconds.

- 6.1.2.2 Each item in a list shall be preceded by a dash or bullet, or if necessary for identification, by a lower case letter followed by a parenthesis. If it is necessary to further subdivide an item in such a list, Arabic numerals followed by one parenthesis shall be used.

Example:

- a)
- b)
 - 1)
 - 2)
- c)

6.1.3 Spelling and abbreviation of names of organizations

- 6.1.3.1 The spelling of the names of organizations, as well as their abbreviations, shall be in accordance with the usage of the organizations in question, in English or French (e.g. IEC, CEI).

- 6.1.3.2 The only official abbreviations of the organs of OIML and of the Metre Convention are those based on the French names (e.g. CIML, never ICLM; or CGPM, and never GCWM; or OIML, and never IOLM).

6.2 Tables**6.2.1 Usage**

Tables should be used whenever appropriate to present information in a more easily understandable form. Each table shall be referred to explicitly in the text so that its significance in relation to the provisions of the publication is made clear.

6.2.2 Numbering

Tables shall be numbered with Arabic numerals, beginning with 1. This numbering shall be independent of the numbering of the clauses and of any figures. When there is only one table in a publication, it shall be designated as "Table 1".

6.2.3 Layout of the title

The title shall be placed above the table and its layout shall conform to the following example:

Table 1 - Metrological requirements

6.2.4 Headings

6.2.4.1 The first word in the heading of each column shall begin with a capital letter and the units used in a column shall be indicated at the bottom of the column heading, as in the following example:

Type	Nominal capacity cm ³	Inside diameter mm	Maximum permissible errors cm ³

6.2.4.2 As an exception to this rule, when all the units are the same, a suitable statement shall instead be placed above the top right-hand corner of the table, as in the following example:

Dimensions in millimetres

Type	Length	Inside diameter	Outside diameter

6.2.5 Continuation of tables

6.2.5.1 When a table is continued over two or more pages, the number of the table shall be repeated followed by the appropriate indication, as in the following examples:

- a) "Table 1 (continued)" on intermediate pages;
- b) "Table 1 (concluded)" on the final page.

6.2.5.2 The column headings shall be repeated on each page where the table appears.

6.3 Figures

6.3.1 Usage

Figures shall be used whenever they permit an easily comprehensible presentation of the information. Each figure shall be referred to explicitly in the text so that the provisions of the Recommendation are clear.

6.3.2 Form

Figures shall be presented in the form of line drawings. Drawings, sketches, graphs, etc. shall be prepared accurately and, as far as possible, in compliance with relevant international standards.

6.3.3 Numbering

Figures shall be numbered with Arabic numerals, beginning with 1. This numbering shall be independent of the numbering of the clauses and of any tables. When there is only one figure in a Recommendation, it shall be designated as "Figure 1".

6.3.4 Layout of title

The title shall be centred below the figure and its layout shall conform to the following example:

Figure 1 – Details of apparatus

6.3.5 Choice of symbols

Symbols used in figures to represent general cases of angular and linear quantities shall be in accordance with the appropriate part of ISO 80000², subscripts being used when necessary to differentiate between different applications of a given symbol.

Example: For a series of symbols indicating various lengths on a drawing, use l_1, l_2, l_3 , etc. and not, for instance A, B, C , etc., or a, b, c , etc.

6.3.6 Style of lettering

6.3.6.1 Lettering used for drawings shall conform to the appropriate part of ISO 3098². Inclined (italic) letters shall be used for

- a) symbols for quantities,
- b) subscripts representing symbols for quantities, and
- c) letter symbols representing numbers.

6.3.6.2 Vertical (upright) letters shall be used in all other cases.

6.3.7 Units

The units in which values are expressed shall be indicated, and shall be in accordance with OIML publication D 2:2007 *Legal units of measurement*.

6.4 References

6.4.1 General

6.4.1.1 When possible, references shall be made to specific elements of texts already published rather than copying long passages of the original source material, due to the fact that such repetition entails the risk of error or inconsistency and increases the length of the publication. If it is not possible to avoid repetition of such material, the source of copied material shall be identified precisely.

6.4.1.2 References to OIML publications shall be made in the forms indicated below; no reference shall be made to page numbers.

6.4.2 References to the OIML publication as a whole and in its own text

6.4.2.1 Generally, the form “this Recommendation...” should be used.

6.4.2.2 However, to avoid possible confusion in the case of an OIML publication that is published in separate parts, the following forms may be used:

- a) “this part of R 76” (reference to one part);
- b) “R 76-2” (reference to one part);
- c) “R 76” (reference to a whole series of parts).

² The publication dates are different for each part.

6.4.3 References to elements of text

6.4.3.1 Use, for example, the following forms:

- a) “in accordance with clause 3”;
- b) “according to 3.1”;
- c) “details as given in 3.1.1”;
- d) “see Annex B”.

6.4.3.2 As shown in the second and third examples above, it is unnecessary to use the term “subclause”.

6.4.4 References to tables and figures

6.4.4.1 Every table and figure included in the publication shall be referred to in the text.

6.4.4.2 Use, for example, the following forms:

- a) “given in Table 2”;
- b) “(see Table 2)”;
- c) “shown in Figure 3”;
- d) “(see Figure 3)”.

6.4.5 References to other OIML publications or to International Standards

6.4.5.1 References to other OIML publications or to International Standards shall be indicated by reference numbers and publication dates. Full details of all references shall be given in an Annex, in accordance with 6.4.5.

Example: “ISO 9000:2005”.

6.4.5.2 References to particular elements of other OIML publications shall be made using the forms given in 6.4.2 and 6.4.3, together with the date of publication.

Example: “according to 3.1.1 of R 76-1:2006”.

6.4.6 Bibliographic references

The rules contained in ISO 690:2010 shall be followed.

6.5 Mathematical style

6.5.1 Presentation

6.5.1.1 Formulae shall be presented in a mathematically correct form with the various quantities being represented by letter symbols; the meanings of these symbols shall be explained below the formula. Descriptive terms, names of quantities, or measurement units shall not be presented in the form of a formula.

6.5.1.2 The following style shall be used:

$$\frac{p_1}{p_2} = 1 + \eta \left[\frac{T_2 - T_1}{T_1} \right]^{\mu/(\mu-1)}$$

where: p_1 is the intake pressure, in pascals;

p_2 is the delivery pressure, in pascals;

η is the isentropic efficiency;

T_1	is the inlet temperature, in kelvins;
T_2	is the outlet temperature, in kelvins;
μ	is the ratio of specific heat capacities.

6.5.1.3 Note that names of units (pascal and kelvin in the above example) are written out in full when they are not preceded by a numerical value.

6.5.2 Symbols with subscripts

6.5.2.1 Symbols having subscripts which themselves bear subscripts shall be avoided as far as possible, as shall any symbols and formulae that would require the printing of an extra line of type.

Examples:

- a) $D_{1,\max}$ is preferable to $D_{1\max}$
- b) In the text, a/b is preferable to $\frac{a}{b}$

6.5.2.2 In a displayed formula, it would be better to use:

$$\frac{\sin[(N+1)\theta/2] \times \sin(N\theta/2)}{\sin(\theta/2)} \quad \text{or} \quad [\sin[(N+1)\theta/2] \times \sin(N\theta/2)] / \sin(\theta/2)$$

than to use

$$\frac{\sin \frac{(N+1)\theta}{2} \times \sin \frac{N\theta}{2}}{\sin \frac{\theta}{2}}$$

6.5.3 Numbering of formulae

6.5.3.1 If it is necessary to number some or all of the formulae in a publication in order to facilitate cross-reference, Arabic numbers in parentheses shall be used, as in the following example:

$$x^2 + y^2 = z^2 \quad (1)$$

6.5.3.2 The numbering of formulae shall be independent of that used in clauses, tables and figures.

6.6 Representation of numerical values

6.6.1 Decimal sign

The decimal sign shall be a point on the line in the English version of a publication.

6.6.2 Values less than 1

If a value less than 1 is written in decimal form, the decimal sign shall be preceded by a zero.

Example: 0.001

6.6.3 Grouping of digits

Each group of three digits to the left or right of a decimal sign shall be separated by a space from the preceding or following digits respectively, except for four-digit numbers designating years.

Examples: 23 456, 2 345, 2.345, 2.345 67, *but* the year 2011.

6.6.4 Multiplication sign

A multiplication sign (\times), rather than a point or the letter “X” or “x”, shall be used to indicate the multiplication of numerical values.

Examples: Write 1.8×10^{-3} (not $1.8 . 10^{-3}$, $1.8 \bullet 10^{-3}$, $1.8 X 10^{-3}$ or $1.8 x 10^{-3}$)

6.6.5 Expression of numbers of items

6.6.5.1 To express numbers of items (as opposed to numerical values of physical quantities), the numerals one to nine shall be written out in full.

Examples:

- a) “Test five tubes, each 5 m long.”
- b) “Select a further 15 tubes for the pressure test.”

6.6.5.2 To express numerical values of physical quantities, Arabic numerals accompanied by the international symbol for the unit shall be used.

6.6.6 Expression of date and time

The date and time formats specified in ISO 8601:2004 shall be used in OIML publications. Dates shall therefore generally be expressed in the form YYYY-MM-DD and times in the form hh:mm or hh:mm:ss as appropriate (using the 24-clock).

Examples:

- a) 3 July 2012 shall be expressed as 2012-07-03;
- b) Half past eight in the morning shall be expressed as 08:30;
- c) Half past eight in the evening shall be expressed as 20:30.

6.7 Abbreviations

6.7.1.1 Abbreviations shall be used with caution and only in cases where there can be no confusion.

6.7.1.2 If a list of abbreviations is not given in the publication itself, the complete term followed by its abbreviation in parentheses shall be given when the abbreviation first appears in the text.

6.7.1.3 An abbreviated term shall be specified only if used subsequently in the document.

6.7.1.4 The general rule is that an abbreviated term comprises capital letters, without a full-stop after each letter. Exceptionally, abbreviated terms consisting of the initial letters of words printed in lower case letters with a full-stop placed after each letter are used (for example, “a.c.” for “alternating current”). However, technical specifications regarding marking may impose other requirements (for example, IEC 61293:1994 specifies marking in the form “AC 230 V”).

6.7.1.5 When a sentence begins with an abbreviated term, which, within the sentence, would consist of several lower case letters, all the letters of the abbreviated term shall be capital letters, for example “A.C.”.

6.8 Indication of dimensions and tolerances

6.8.1.1 Dimensions and tolerances shall be indicated in an unambiguous manner.

Examples:

- a) 80 mm × 25 mm × 50 mm (not 80 × 25 × 50 mm)
- b) 80 mm ± 2 mm
- c) 80_0^{+2} mm (not 80_{-0}^{+2} mm)

6.8.1.2 In order to avoid misunderstanding, tolerances on percentages shall be expressed in a mathematically correct form.

Examples:

- a) Write “from 63 % to 67 %” to express a range.
- b) Write “(65 ± 2) %” to express a centre value with tolerance.

In neither case shall the form “65 ± 2 %” be used.

Annex A
Drafting and presentation of terms and definitions
(Mandatory)

A.1 General principles

A.1.1 Choice of concepts to be defined

- A.1.1.1 Any term that is not self-explanatory, commonly known, or which may be interpreted differently according to the context shall be defined by specifying the relevant concept.
- A.1.1.2 Common dictionary terms or current technical terms shall be included only if they are used with a specific meaning in the relevant context.
- A.1.1.3 Trade names as well as archaic and colloquial terms shall be avoided.
- A.1.1.4 Non recommended terms may be included but they shall be clearly indicated by “(non recommended: ...)”. The preferred term shall then be shown.
- A.1.1.5 Only the concepts that are used in the publication shall be defined, with the exception of any additional concepts and terms judged necessary for understanding these definitions.

A.1.2 Avoidance of duplications and contradictions

- A.1.2.1 Before specifying a term and definition for a concept, it should be ascertained that no other term or definition for that concept exists in an international vocabulary (VIM, VIML, etc.).
- A.1.2.2 When it is necessary to repeat a definition, an informative reference shall be made to the international vocabulary from which it is reproduced.
- Example:* measurement error: measured quantity value minus a reference quantity value [VIM 2.16].
- A.1.2.3 If a term is defined in an international vocabulary, the introduction in a publication of a different term (synonym) for the defined concept or of a modified definition of the term, is only acceptable in exceptional cases. A justification shall be given in a note.

A.1.3 Drafting of definitions

- A.1.3.1 A definition shall contain all necessary and sufficient elements to enable easy comprehension of the concept and a clear determination of its limits.
- A.1.3.2 A definition shall be adequate for its intended purpose. It shall be theoretically correct with the precision needed for its relevant context.
- A.1.3.3 The preferred structure of a definition is as follows: a basic part stating the class to which the concept belongs, followed by another part enumerating the characteristics that distinguish the concept from other elements of the class. The narrowest well-defined or well-known class shall be chosen.
- Example:* cryogenic liquid: fluid of which the boiling point is less than 120 K and which has been liquefied by refrigeration

- A.1.3.4 If it is difficult or impossible to structure a definition as indicated in A.1.3.3, it may be drawn up by enumerating the important parts of the concept.
Example: measuring system: complete set of measuring instruments and other equipment assembled to carry out a specified measurement task
- A.1.3.5 If it is difficult or impossible to structure a definition according to either of the examples indicated in A.1.3.3 and A.1.3.4, it may be replaced by examples or explanations.
- A.1.3.6 Terms used in a definition shall be unambiguous or shall be defined separately.
- A.1.3.7 Definitions in which one concept is defined by a second concept, and the second by the first, are not permitted.
- A.1.3.8 A drawing may be used to clarify the content of a definition, but the text of the definition shall be complete in itself, without the drawing.
- A.1.3.9 A definition shall not take the form of a requirement nor shall it contain one.

A.2 Presentation

The following rules apply to the presentation of the element “terms and definitions” of OIML publications.

A.2.1 Layout

- A.2.1.1 The preferred term(s) or symbol(s) shall be set in bold type on a new line, after the entry number, starting with a lower case letter except for any capital letters required by the normal written form in running text. For complex terms (e.g. compounds and multiword terms), the natural word order shall be retained.
- A.2.1.2 Admitted term(s) or symbol(s) shall be set in normal type and each placed on a new line, after the preferred term.
- A.2.1.3 Deprecated term(s) or symbol(s) shall be set in normal type and each be placed on a new line. They shall be identified by an appropriate text, e.g. "DEPRECATED:".
- A.2.1.4 The definition shall be placed on a new line, starting with a lower case letter, except for any capital letters required by the normal written form, and shall not be followed by a full-stop.

Example:

2.16

measurement error

error of measurement

error

measured quantity value minus a reference quantity value

A.2.2 Synonyms

Synonyms shall be separated by a semicolon (;).

A.2.3 Grammatical form of terms

Terms shall be presented in their basic grammatical form, i.e. generally, nouns in the singular, verbs in the infinitive.

A.2.4 Symbols for missing terms

If, for a defined concept, no equivalent term exists in one of the languages, the absence of the term shall be indicated by a symbol consisting of five points (.....).

A.2.5 Parentheses and brackets

A.2.5.1 Parentheses () enclosing a part of a term indicate that that part of the term may be omitted, provided that no confusion can arise in the context in which the term is employed. In the following example, the parentheses indicate that the term “compound” may be used alone, in the field of the terminology, as having the same meaning as “compound word”.

Example: compound (word)

A.2.5.2 Square brackets [] enclosing a part of a term indicate that the words placed between them may replace all or some of the preceding words. This convention should be used only when it is necessary to economize space or to show at first sight the construction of synonyms.

Example: bending load; flexural load; transverse load

may also be presented as:

bending [flexural] [transversal] load.

Annex B
Verbal forms
(Mandatory)

In this annex, only singular forms are shown.

Table B.1 - Requirement

The verbal forms shown in this table are used to indicate requirements to be followed strictly in order to conform to the Recommendation.

Verbal form	Equivalent expressions (see 6.1.1)
shall	is to ... is required to ... it is required that ... has to ... only ... is permitted it is necessary ...
shall not	it is not allowed [permitted] [acceptable] [permissible] ... is required to be not ... is required that ... be not is not to be ...
<p><i>Notes:</i></p> <ol style="list-style-type: none"> 1 Do not use “must” except to describe “unavoidable” situations. 2 Do not use “may not” instead of “shall not” to express a prohibition. 3 To express a direct instruction, for example referring to steps to be taken in a test method, use the imperative mood. <p><i>Example:</i> Switch on the recorder.</p>	

Table B.2 - Recommendation

The verbal forms shown in this table are used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is not recommended but not prohibited.

Verbal form	Equivalent expressions (see 6.1.1.)
should	it is recommended that ... ought to ...
should not	it is recommended that ... does not ought not to ...

Table B.3 - Permission

The verbal forms shown in this table are used to indicate a course of action permissible within the limits of the standard.

Verbal form	Equivalent expressions (see 6.1.1.)
may	is permitted is allowed is permissible
need not	it is not required that ... no ... is required
Notes: See also the note under Table B.4. 1 Do not use “can” instead of “may” in this context. 2 Do not use “possible” or “impossible” in this context.	

Table B.4 - Possibility

The verbal forms shown in this table are used for statements of possibility and capability, whether material, physical or causal.

Verbal form	Equivalent expressions (see 6.1.1.)
can	to be able to ... to be in a position to ... there is a possibility of ... it is possible to ...
cannot	to be unable to ... to be not in a position to ... there is no possibility of ... it is impossible to ...
<i>Note:</i> “May” signifies permission expressed by the standard, whereas “can” refers to the ability of a user of the standard or to a possibility open to him/her.	