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Physiological quantities and their units —

Part 3: **Chemistry**

Grandeurs physiologiques et leurs unités —

Partie 3: Chimie

ICS 01.060

This draft is submitted to a parallel enquiry in ISO and a CDV vote in the IEC.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 80003-3 was prepared by Technical Committee ISO/TC 12, Quantities and units, units in co-operation with IEC/TC 25, Quantities and units.

ISO 80003 consists of the following parts, under the general title *Physiological quantities and their units* :

— *Part 2: Physics*

— *Part 3: Chemistry*

IEC 80003 consists of the following parts, under the general *Physiological quantities and their units*:

— *Part 1:* Mo*dalities*

— *Part 4: Biology*

— *Part 5: Culturology*

— *Part 6: Psychology*

Introduction

0.1 Modalities

There are seven modalities used to describe the interaction between the human body and the environment in the broadest sense. These modalities are: tango, video, audio, chemo, radio, calor, and electro. Each of these seven modalities are subdivided in two sub-groups, i.e. in and out if the interaction is from the environment to the human body or is from the human body to the environment, respectively. These modalities are described in IEC 80000-14, and are not given in this part of the International Standard.

In this part, only the modalities CHEMO and ELECTRO are taken into account.

0.2 Arrangements of the tables

The tables of quantities and units in clauses 5 and 6 are arranged so that the quantities are presented on the left-hand pages and the units on the corresponding right-hand pages.

All units between two full lines on the right-hand pages belong to the quantities between the corresponding full lines on the left-hand pages.

0.3 Tables of quantities

The names in English and in French of the most important quantities or nominal properties within the field of this document are given together with their symbols and, when appropriate, their definitions. Their symbols are given and when a symbol outside of the Latin alphabet is used, its Unicode (see ISO/IEC 10646) is given. These names and symbols are recommendations. Further, the OID is given and, if necessary, one or more remarks.

The scalar, vectorial or tensorial character of quantities is pointed out, especially when this is needed for the definitions.

In most cases only one name and only one symbol for the quantity are given; where two or more names or two or more symbols are given for one quantity and no special distinction is made, they are on an equal footing. When two types of italic letters exist (for example as with ϑ and θ; φ and ϕ; a and a; g and g) only one of these is given. This does not mean that the other is not equally acceptable. It is recommended that such variants should not be given different meanings. A symbol within parenthesis implies that it is a reserve symbol, to be used when, in a particular context, the main symbol is in use with a different meaning.

In this English edition the quantity names in French are printed in an italic font, and are preceded by *fr*. The gender of the French name is indicated by (m) for masculine and (f) for feminine, immediately after the noun in the French name.

0.4 Tables of units

0.4.1 Units for general quantities

The names of units for the corresponding quantities are given together with the international symbols and the definitions. These unit names are language-dependent, but the symbols are international and the same in all languages. For further information, see the SI Brochure (8th edition 2006) from BIPM and ISO 80000-1.

The units are arranged in the following way:

a) The coherent SI units are given first. The SI units have been adopted by the General Conference on Weights and Measures (Conférence Générale des Poids et Mesures, CGPM). The coherent SI units, and their decimal multiples and submultiples formed with the SI prefixes are recommended, although the decimal multiples and submultiples are generally not mentioned.

b) Some non-SI units are then given, being those accepted by the International Committee for Weights and Measures (Comité International des Poids et Mesures, CIPM), or by the International Organization of Legal Metrology (Organisation Internationale de Métrologie Légale, OIML), or by ISO and IEC, for use with the SI. Such units are separated from the SI units in the item by use of a broken line between the SI units and the other units.

0.4.2 Remark on units for quantities of dimension one, or dimensionless quantities

The coherent unit for any quantity of dimension one, also called a dimensionless quantity, is the number one, symbol 1. When the value of such a quantity is expressed, the unit symbol 1 is generally not written out explicitly.

EXAMPLE

Refractive index n = 1,53 × 1 = 1,53

Prefixes shall not be used to form multiples or submultiples of this unit. Instead of prefixes, powers of 10 are recommended.

EXAMPLE

Reynolds number Re = 1,32 × 10^3

Considering that plane angle is generally expressed as the ratio of two lengths and solid angle as the ratio of two areas, in 1995 the CGPM specified that, in the SI, the radian, symbol rad, and steradian, symbol sr, are dimensionless derived units. This implies that the quantities plane angle and solid angle are considered as derived quantities of dimension one. The units radian and steradian are thus equal to one; they may either be omitted, or they may be used in expressions for derived units to facilitate distinction between quantities of different kind but having the same dimension.

0.5 Numerical statements in this standard

The sign = is used to denote “is exactly equal to”, the sign ≈ (Unicode 2248) is used to denote “is approximately equal to”, and the sign ≔ (Unicode 2254) is used to denote “is by definition equal to”.

Numerical values of physical quantities that have been experimentally determined have an associated measurement uncertainty. This uncertainty should always be specified. In this standard, the magnitude of the uncertainty is represented as in the following example.

EXAMPLE

l = 2,347 82(32) m

In this example, $l = a(b)$, the numerical value of the uncertainty b indicated in parentheses is assumed to apply to the last (and least significant) digits of the numerical value a of the length l. This notation is used when b represents one standard uncertainty (estimated standard deviation) in the last digits of a. The numerical example given above may be interpreted to mean that the best estimate of the numerical value of the length l when l is expressed in the unit metre is 2,347 82 and that the unknown value of l is believed to lie between (2,347 82 – 0,000 32) m and (2,347 82 + 0,000 32) m with a probability determined by the standard uncertainty 0,000 32 m and the probability distribution of the values of l.

0.6 Special remarks on OID codes

For each quantity a unique Object IDentifier (OID) code is given. These codes are given in order to identify all quantities in an unambiguous way in telecommunications and are provided by ITU. The OID codes are needed to have a unique representation of quantities for telecommunications in Abstract Syntax Notation One (ASN.1) messages, see ITU-T Rec. X.409, X.683, X.690, X.691, X.693, and X.1080.1.

OID codes for quantities are given in the tables. OID codes for units are given in IEC 80003-1[1].

[1] in preparation

Physiological quantities and their units — Part 3: Chemistry

1 Scope

This part of ISO 80003 gives names, symbols, Unicode symbols (when necessary), and definitions for chemical quantities and their units to be used in e-health. Where appropriate, conversion factors are also given.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 80000-14:2007, *Quantities and units — Part 14: Telebiometrics related to human physiology*[2)]

3 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC 80000-14:2007 apply.

4 Chemical quantities and their units used for e-health

The names, symbols, and definitions for quantities and units related to chemistry to be used in e-health are given in the tables on the following pages.

For ISQ (International System of Quantities) see ISO 80000-1 and for SI (International System of Units) see the SI brochure.

This document applies to all of telemedicine, which is used to express the observed signs in a standardized manner.

OID codes for practitioners providing chemical values to e-health Care Giver, according to International Labor Organization (ILO) are given in Annex B.

2) To be replaced by IEC 80003-1.

5 Quantities and units for signs observed in CHEMO–IN and CHEMO–OUT

CHEMO–IN and CHEMO–OUT SIGNS			QUANTITIES		
Item No.	**Name**	**Symbol** **[Symbol Unicode]**	**Definition**	**OID code**	**Remarks**
3-5.1	amount of substance *fr quantité* (f) *de matière*	n	ISO 80000-9:2009, item 9-1	{2 42 1 1 1 2 6}	
3-5.2	Avogadro constant *fr constante* (f) *d'Avogadro*	L, N_A	ISO 80000-9:2009, item 9-4	{2 42 1 1 1 2 72}	L = 6,022 141 29 (27) x 10^{23} mol^{-1} [CODATA 2006]
3-5.3	osmotic pressure *fr pression* (f) *osmotique*	Π [03A0]	ISO 80000-9:2009, item 9-30	{2 42 1 1 1 2 73}	
3-5.4	ionic strength *fr force* (f) *ionique*	I	ISO 80000-9:2009, item 9-52	{2 42 1 1 1 2 74}	
3-5.5	electrolytic conductivity *fr conductivité* (f) *électrolytique*	$\varkappa$, σ [03F0, 03C3]	ISO 80000-9 :2009, item 9-54	{2 42 1 1 1 2 75}	
3-5.6	mass concentration of water vapour *fr concentration* (f) *en masse de vapeur d'eau*	v	ISO 80000-5:2007, item 5-25	{2 42 1 1 1 2 76}	
3-5.7	mass ratio of water to dry matter *fr rapport* (m) *de la masse d'humidité à la masse de matière sèche*	u	ISO 80000-5:2007, item 5-26	{2 42 1 1 1 2 77}	

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UNITS			CHEMO-IN and CHEMO–OUT SIGNS	
Item No.	**Name**	**Inter-national symbol [Symbol Unicode]**	**Definition**	**Remarks**
3-5.1.a	mole	mol		
3-5.2.a	mole to the power minus one	mol^{-1}		
3-5.3.a	pascal	Pa	N/m^2	
3-5.4.a	mole per kilogram	mol/kg		
3-5.5.a	siemens per metre	S/m		
3-5.6.a	kilogram per cubic metre	kg/m^3		
3-5.7.a	one	1	kg/kg	

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